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# A

# PRACTICAL TREATISE

# ON THE

# DISEASES OF CHILDREN.

A

# PRACTICAL TREATISE

ON THE

# DISEASES OF CHILDRE

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BY

## J. FORSYTH MEIGS, M.D.,

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FOURTH EDITION

(OF MEIGS ON DISEASES OF CHILDREN),

REVISED AND GREATLY ENLARGED.

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TO

GEORGE B. WOOD, M.D., LL.D.,

**President of the College of Physicians of Philadelphia; Emeritus Professor of the Theory and Practice of Medicine in the University of Pennsylvania; late one of the Physicians to the Pennsylvania Hospital, &c. &c.,**

This Work is Dedicated,

AS

A TRIBUTE OF RESPECT FOR HIS HIGH PROFESSIONAL ATTAINMENTS

AND

EMINENT PRIVATE VIRTUES,

AND AS

A MARK OF GRATITUDE FOR HIS VALUABLE INSTRUCTIONS,

BY

THE AUTHORS,

J. FORSYTH MEIGS,
WILLIAM PEPPER.

# PREFACE

## TO THE FOURTH EDITION.

It has been some years since the third edition of *Meigs on the Diseases of Children* has been exhausted; and the frequent inquiries which have been made for the work, as well as the increasing interest taken by the profession in the study of the diseases of childhood, have led to the belief that the publication of a new edition would be received with the same kind favor which has been already extended to the three former ones.

The changes and additions which were necessitated by the great advance made during the last decade in our knowledge of a number of the diseases of children, as well as by the unavoidable omission of any consideration of several important subjects in the previous editions of this work, were however of so extensive a character that it has been found necessary to associate a collaborator in the preparation of the present edition.

Among the principal of these changes may be mentioned the great enlargement of several articles, and especially of those on thrush, convulsions, chorea, tracheotomy in croup, and parasitic skin diseases. Other articles have been entirely rearranged, or even rewritten, as those upon the diseases of the stomach and intestines, and upon eczematous affections. In addition to such changes, however, there have been no less than seventeen full articles added, embracing the following important subjects: diseases of the heart, and cyanosis; diseases of the cæcum and appendix vermiformis, and intussusception; chronic hydrocephalus, tetanus, atrophic infantile paralysis, facial paralysis, and progressive paralysis with apparent hypertrophy of the muscles; rheumatism, diphtheria, mumps, rickets, tuberculosis, and infantile syphilis; typhoid fever; and sclerema. These various additions and changes have involved the introduction of more than two hundred pages of new matter. Several extensive tables, exhibiting the mortality in this city of some of the most common and fatal diseases, in connection with the variations of temperature, have been prepared with great care from the records of the office of the Board of Health, which were opened to examination through the courtesy of Mr. Chambers, the Chief Registration Clerk of that office. A copious index has also been supplied, which it is trusted will facilitate reference, and render the work more practically serviceable.

Apart from these changes, however, no alteration has been made in the general plan of the work. As in the composition of the previous editions, the best and most recent foreign and domestic authorities on the diseases of children have been frequently and carefully consulted, and their views fully quoted whenever they appeared of practical importance. For the most part, however, the opinions expressed in the following pages are those to which the authors have been led by their personal observation, and which they therefore believe to have been approved by the most searching of all tests, that of practical application.

It has also been their constant aim, while supplying a sufficient amount of information upon questions of etiology, pathology, and morbid anatomy, to insure a practical character to the work. With this view, an unusual amount of space has been devoted to the discussion of the treatment of the different diseases, and in every instance the conclusions derived by the authors from their own experience have been fully, and, it is hoped, clearly stated.

In so doing, it has been necessary to consider somewhat at length the extremely important questions of the employment of venesection, antimony, calomel, and stimulants; and a full expression of opinion upon each of these points will be found in its appropriate place.

In conclusion, the authors would venture to express the hope that their efforts may have been successful in furnishing a work which will aid in rendering the study of the diseases of children more attractive and clear, their recognition more easy, and which may serve as a practical guide in the difficult task of treating these disorders.

PHILADELPHIA, February, 1870.

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# A
# PRACTICAL TREATISE
# ON THE
# DISEASES OF CHILDREN.

---

## INTRODUCTORY ESSAY.

### ON THE CLINICAL EXAMINATION OF CHILDREN.

THE clinical examination of children, and particularly of young infants, cannot be successfully practised upon the same method as that habitually made use of in the case of adults. The truth of this statement will be readily assented to by all who have had much experience in the treatment of the diseases of the two ages, by those who will reflect for a moment on the great differences in the expressions of the various organs in early and adult life, and by those who are acquainted with the opinions of distinguished writers upon children's diseases. It is proper and useful, therefore, to preface a practical work on the diseases of children, with a sketch or plan of the best method to be pursued in forming a diagnosis of these diseases, and with remarks upon the physiological characters which distinguish the organization of early life from that of maturity.

The difficulties that beset the path of the practitioner in his clinical examination of children are so great that he who has not been prepared by preliminary study to surmount these obstacles, will find it a most uncertain and dubious task to unravel the history and nature of any case that may be set before him. The helpless silence of the infant,—the wilful silence, or the loose and inconsistent answers of the older child, which lead astray the mind rather than guide it to true results,—the agitation and fright produced by the examination, rendering it impossible at times to ascertain the real state of the different functions of the economy,—and, lastly, the difficulty of obtaining accurate and reliable accounts of the history of the case from the attendants, all combine to make the duty of the physician most perplexing, and, unless he be gifted with a large share of patient and philosophic calmness, most irksome and trying to the temper. So great, indeed, are the difficulties encountered by some practitioners who enter upon this branch of the practice of medicine without proper preliminary preparation, that they never overcome them; but, to use the words of Dr. West, "grow satisfied with their ignorance, and will then, with the greatest gravity, assure you that the attempt to understand these affections is useless." That it is possible, however, to overcome, in great measure, these obstacles, and to arrive at a correct diagnosis in nearly all cases, is quite as true as that these obstacles really exist. But, in order to do this, the physician must first be aware that difficulties exist, and must have formed in his mind some plan or method by which to surmount or elude them.

Before proceeding to show what is the best method of examining or exploring disease in children, we must state that our remarks apply chiefly to infants and very young subjects; for, after the age of eight and ten years, the physical and intellectual development have progressed to such a point as to render the method of diagnosis nearly the same as that employed in adults.

The chief causes which render the diagnosis of disease in young children difficult, are the absence of the faculty of speech, and the violent agitation generally caused by the examination, which prevents a proper appreciation of the state of certain organs and functions.

It is easy to understand how much our means of diagnosis are restricted by the absence of the faculty of speech. How many symptoms are there in the case of adults with which we become acquainted only through the patient's own account of his sensations; and, consequently, of how many must we be deprived in children by the absence of this account! It might, indeed, at first view, seem impossible to detect the nature of the sickness without the assistance of this means, so greatly do we depend upon it in our examinations of adults. Nevertheless, we shall find ourselves enabled, by an attentive consideration of other resources in the child, by a close study of its physiognomical expression, its decubitus, the nature of its cry, and by the most rigidly careful physical examination, to form our conclusions with almost as great a degree of precision as in older patients.

The other causes of difficulty,—the violent disturbance, both physical and moral, of the child, its fright, agitation, and cries,—constitute, when they are present in a high degree, much greater embarrassments than the want of speech. To overcome these, the physician must use all his skill, tact, and patience; for, unless they can be avoided by art, or overcome by soothing and gentle persuasion, he can learn but little that will be of essential service to him in making up his opinion. He can neither read the countenance of the little patient, nor judge by its attitudes or decubitus of the state of the various organs, whether internal or external; he will be unable to ascertain the rate, force, or regularity of the circulatory or respiratory functions; he cannot, to any useful purpose, examine the abdomen, to learn whether it be tender on pressure, or whether its contained organs be in their natural condition as to size and position; and, lastly, he will find that the physical exploration of the lungs and heart, by auscultation and percussion, yield him at best only imperfect results.

To avoid the difficulties just detailed, it is always useful, if not absolutely necessary, to conduct certain portions of the examination whilst the child is calm and quiet, and certain others whilst it is disturbed and agitated. This distinction of the examination into two periods, or stages, is one of the utmost importance in a practical point of view, and should never be forgotten by the physician during his clinical observation of the various symptoms the patient may present.

By the period of calm is meant a condition of total quiescence, in which the child is undisturbed either by internal or external causes of irritation. This condition is best found in the state of sleep. If this cannot be obtained, the one most nearly approaching to it is that which exists during the act of nursing, or which follows that act. Suckling is usually followed, even in the sick child, by a condition of drowsiness or by a gentle and languid slumber, during which it will allow a careful examination upon many points without agitation. If possible, therefore, the physician should always see the child when asleep, and if the mother or nurse propose, on the occasion of his visit, to hurry up stairs to prepare the child, or to bring it down into the parlor or lower room, he should ask, as a favor, that he may see it asleep.

If, in spite of having just been nursed, the child be awake and fretting, and when, also, it is more advanced in age, we should endeavor, by the attraction of toys, by gentle and soothing words and manners, by fondling, or by having it carried about the room, to get it quiet.

Before proceeding to a consideration of the particular means by which we are to judge of the state of health or sickness of young subjects, it is proper to call attention to the great importance of a careful examination of the attendants, in regard to the history of the case, previous to and between the medical visits. In the instance of children, their inability to describe their own symptoms compels us to depend entirely upon the mother or nurse for all detail of the case previous to our first visit, and for all accounts of what may have happened between two subsequent ones. It is, therefore, extremely important that this part of the examination should be conducted with every care and caution. Very much that is useful may be learned from it, if it be well managed. A great deal of skill and art are required in putting the questions, and in sifting the evidence thus collected. We should always bear in mind the character of the persons questioned. Much depends upon their education, and much more on their natural powers of observation, and manner of relating what they may have seen. The degree of credence to be attached to their answers must rest upon their probable intelligence. Nurses and mothers will often give accounts of their charges which must be received with large allowance, and even in some few instances with disbelief. We would, however, in this place, most earnestly caution the young practitioner of medicine to be very careful not to misbelieve, or even mistrust, without well-poised reasons, the account of a sick child given by a mother; for though a foolish, weak woman will often give a false or exaggerated statement of the symptoms of her child, an observant and intelligent, and sometimes a foolish and weak one, when guided by maternal instinct, will detect variations from the healthful condition of a child, which may entirely escape the search of the most acute and rigorous medical observer. A mother may perceive a change in the expression of the face, in the manner of the muscular movements, in the temper or conduct of her child, which shall fail to attract the attention of the practitioner; or it may be that the symptom which has caused the parent to take alarm occurs only during the absence of the physician. The medical attendant ought, for these reasons, to listen patiently and kindly to whatever the mother or nurse may have to say, and if unable to detect immediately what they assert they have seen, let him not determine at once that there has been a mistake, that their anxiety has deceived them; but let him examine the patient yet again, and more carefully, or let him pay another visit to learn whether the symptom or symptoms continue, or have occurred again. Our own rule, in a doubtful case, is to listen with religious attention to the mother, and unless she be far beneath the average of human intelligence, our opinion as to the fact of some deviation from the ordinary health of the child is considerably influenced by what she tells us.

The inquiry in regard to the history of the case, previous to the first visit of the physician, should bear particularly upon the causes of the sickness, its precise moment and mode of attack, and its course and symptoms up to the present time. The most important points to be considered in connection with these objects, are the health of the parents, including their ordinary health, or their habitual diseases, the causes and periods of their death, if they are not living, and the state of health of the child at the moment of birth and since. The hygienic conditions in which the patient has been placed ought always to be investigated; the place of habitation; the kind of house, and whether a large well-ventilated room, or a small, narrow, and close one; the clothing; the food; and lastly, whether the infant has been suckled, or brought up on artificial diet. The state of the health just anterior to the attack ought always to be examined into. Has it been good and strong, or feeble and delicate? If delicate, what diseases? If the approach of any of the eruptive fevers be suspected from the character of the symptoms, the question as to whether the child has previously had measles or scarlet fever, or has been vaccinated or had variola, should always be asked.

It is next necessary to fix as accurately as possible, the precise period of the onset of the sickness. If the question, "When was the child taken sick?" be asked, as it usually is, the answer will be, "Oh, several days ago," or, "I don't recollect exactly—I think yesterday, or the day before," or some such loose answer. The best way to learn the exact period in a recent case, is to go back, day by day, or else to inquire as to some particular day. We may ask, was the child quite well day before yesterday; was it well last Sunday? did it play and amuse itself? was it as gay and good-tempered as usual yesterday, or the day before, or the day before that? Did it sleep well night before last, or the night before that? A sick child never scarcely sleeps well at night, and very often we may learn by close inquiry into this particular, the exact time at which the attack began. In this way, by forcing the attendant to tax her memory, and to go minutely over the events of the several days previous, we shall nearly always succeed in fixing very precisely the moment of onset.

Having determined these points, we should proceed to inquire in regard to the course of the disease prior to the first visit. This is to be done only by patient and repeated questioning. The questions must be so framed as to elicit free and unbiassed answers. They should be general, and not leading. Lastly, we are to inquire into the treatment of the case up to the present time.

It is best that all these interrogatories should be made previous to seeing the child, in some other room than the nursery, in order to avoid the risk of alarming the child by the presence, during an unnecessary length of time, of a stranger. If, however, the child be well acquainted with the physician, it matters not where the inquiries are made.

Having now obtained from the attendants all the information they can give in regard to the history and nature of the case, the physician must proceed to the personal examination of the patient, in order to determine, by his own observation, the exact nature of the sickness, and the treatment it may require.

The most important points to be attended to during the clinical examination, are the countenance or facies, noting its expression, coloration, the presence or absence of furrows and wrinkles from pain, from emaciation, or from disordered muscular action, the appearances presented by the nasal orifices, and especially by the alæ nasi, and the characters exhibited by the mouth; the sleep; the cry; the state of embonpoint or emaciation; the condition of the skin as to coloration, temperature, moisture or dryness, the presence of swellings of any kind, such as those produced by dropsy or by affections of the joints, and the existence of eruptions; the pulse; impulse of the heart; the respiration; the signs furnished by the state of the mouth and throat, and by the disposition towards and power of sucking, or by the manner in which drinks are taken; and lastly, the state of the abdomen.

THE COUNTENANCE.—The countenance of a young and healthy infant, who is sleeping or perfectly quiet, wears no expression except that of comfort and content. It is composed and still; no movement disturbs its innocent tranquillity, unless, perhaps, some gentle smile light it up from time to time, when we might well believe the happy superstition of the fond mother, who will tell us that angels are whispering it. In sickness, even when slight, the countenance soon loses this expressionless character. In all acute disorders the alteration is very great, such indeed as to strike the most careless and inexperienced observer. The features become contracted, furrows and wrinkles appear about the forehead, the nostrils are dilated, or pinched and thin, and the mouth becomes drawn and rigid. The extent of the change is generally in proportion to the severity of the attack. The part of the face most altered will depend very much upon the particular system of organs implicated in the disease.

Some authors have endeavored to show that different diseases give to the physiognomy certain peculiar and characteristic *expressions*. This is true only to a certain extent. Thus, the facies is very different in abdominal from that observed in thoracic or cerebral diseases; but though it is *generally* easy for a practised physician to distinguish by the facies alone between a cerebral and thoracic disorder, it is quite impossible for him to distinguish between any two cerebral, thoracic, or abdominal affections. The particular changes impressed upon the face by different diseases cannot, however, be discussed in this place, but must be considered in the separate articles upon each disease. Here it can only be stated in general terms, that, in diseases of the brain, the upper part of the face, the forehead, and the eyes are chiefly affected; that in diseases of the thoracic organs, the middle portion of the face, and especially the nostrils; while in those of the digestive organs, the lower part of the face, the mouth and lips, are the parts which undergo the greatest changes in their expression.

*Pain* may almost always be detected by the expression of the face. It gives to the countenance various shades of expression, according to its degree of severity, and its permanency or recurrence at intervals. Pain in the head is said, by Dr. M. Hall, to produce a contracted brow, pain in the belly to occasion an elevation of the upper lip, whilst pain in the chest is chiefly denoted by sharpness of the nostrils. We doubt, however, whether pain in any particular organ imparts an expression to one part of the face rather than to another, for indeed pain in any part of the body, whether the head, chest, abdomen, or limbs, gives rise to a contraction of all the features. Not one part of the face alone, but the forehead, mouth, nose, and the whole face, become changed in expression and contracted, when there is severe pain in any part of the body, so that we deem it impossible from the expression alone, to determine where the painful sensation may be seated. The countenance merely tells us there is pain, but not where it is located. The painful expression will be permanent or occasional, as the pain itself is constant or only paroxysmal.

The *coloration* of the face becomes often an important means of diagnosis. In all the fevers, phlegmasiæ, and diseases of general excitement, the face will be more or less suffused and red, unless the attack be so severe as to occasion a violent shock to the nervous system, in which event the countenance instead of being suffused, is paler than natural. In such cases the face becomes of a dead white, all traces of red disappear, and the skin at the same time has often a slightly shining or varnished appearance. We have not unfrequently observed this symptom in pneumonia and bronchitis, and also in the latter stages of true croup. It is a very striking phenomenon, and one which portends great danger.

In chronic cases of all kinds in which the hematosic and nutritive functions are enfeebled, the face assumes a pallid and waxen hue, which is very characteristic. In the various digestive ailments it becomes icterode or sallow, and in affections of the liver more or less yellow. Lastly, in certain diseases and malformations of the heart or lungs, it becomes bluish or livid, constituting one of the most important signs of what is called morbus cœruleus, blue disease, or cyanosis.

In reading the countenance of a sick child, the practitioner should always notice the play of the nostrils, since this reveals, to a certain extent, the state of the lungs. In pneumonia, bronchitis, and pleurisy, the movements of the alæ nasi become rapid and energetic, expressing, by the degree of their violence and extent, the amount of embarrassment under which the respiratory function is laboring.

The nostrils and nasal passages should always be examined also to ascertain the presence of mucous or purulent secretions, or of pseudomembranous deposits, since these fluids or their inspissated products interfere more or less with the free passage of air through those canals.

Of the Sleep.—Much useful information as to the state of health of infants and children may be obtained from a careful consideration of the various phenomena connected with their sleep. Of this we are fully convinced from somewhat long and patient observation. We cannot ascertain, indeed, the nature of the disease under which the child may be laboring, but we can detect, with very great certainty, the existence of a deviation from health. We know of few more certain means of fixing the period at which any attack of illness may have begun, than by inquiring at what time the child began to have restless or broken sleep, or insomnia.

A perfectly healthy infant, within the month, who is suckled at an abundant and wholesome breast, will usually sleep twenty out of the twenty-four hours, waking to nurse every two or three hours during daylight, and twice or three times during the night. After the age of two or three months, the child is much more wakeful during the day, though it will still take a nap of two or three hours in the morning, and a shorter one in the afternoon, while it will sleep from early evening until the following morning, waking but once or twice to suck. Indeed, many perfectly healthy infants, of between three and six or seven months of age, sleep without waking from nine or ten o'clock in the evening, until six the next morning. After the latter age, the sleep is seldom so unbroken; the child begins to undergo the first considerable trial to its health, dentition, and it is rendered thereby more or less ailing and irritable, and consequently restless and troublesome at night.

Children who have passed through the epoch of dentition, and who are *perfectly well*, usually go to sleep soon after being put to bed, and never wake until the following morning. Not only so, but they sleep soundly and quietly, without being disturbed by slight sounds, and without tossing or turning much in their sleep.

In healthful sleep the whole appearance of the child, its expression of countenance, its attitude, and its breathing, all declare a most perfect and beautiful ease and tranquillity. Nothing can be more suggestive of the comfort and well-being that naturally attend upon health, than the perfect composure and graceful postures exhibited by a hearty child during profound sleep.

It needs, however, but a slight disturbance of the health of a child to break in upon its ordinarily calm and peaceful sleep, and to render this restless, fitful, interrupted by startings, cries, or dreams, or insufficient. The most trifling irritations, as the pressure of a tooth against the gum, the presence in the digestive canal of a little imperfectly digested food, or of one, two, or three lumbricoides, or the slightest fever from any cause, are sufficient to produce this effect, and hence it is that the character of the sleep will often become to a watchful practitioner the first sign of disorder held out by nature.

The degree of disturbance of this function will vary with the nature and severity of the disturbing cause. When slight, the child will continue to sleep throughout the ordinary period, but the sleep will be somewhat uneasy. The countenance will be disturbed. There will be contractions of the brow, and momentary workings of the features which express the perception of some unhealthful sensation. Often the child will toss and turn, and change its position more frequently than natural. Sometimes it will cry out, and appear distressed by some dream or painful sensation. When the cause of disturbance is more serious, the sleep is more broken, the child wakes often, and lies awake for a longer or shorter time, and it becomes very difficult to lull it to sleep again. Or it has painful dreams or nightmare, causing it to scream and struggle in sleep, and then to wake in the most violent affright. In severe instances it becomes almost sleepless. We have very often known teething children not to sleep more than half as much as in health, and to wear out, by the long continuance of this sleeplessness, the patience and even the health of their attendants. In some instances they will no longer sleep in the bed or crib, and the nurse is obliged to get up and walk with them, or soothe them by the movement of a rocking chair or cradle. In other cases, the derangement of the health is shown by grinding of the teeth, and by the most violent tossing and tumbling about the bed. We have frequently seen a child lying with its head where its feet should be, or across the bed, and with all the coverings thrown off, in spite of the most careful arrangement of the bed-clothes.

These various disturbances are therefore signs of some alteration in the health of the child. They do not lead to an appreciation of the precise nature of that alteration, but they are invaluable as affording indications of the existence of some morbid condition of the economy. Very often, as above stated, they are the first symptoms of the approach of some more or less serious sickness, and as such will often enable us to determine, with much precision, the moment of onset of the attack.

The Cry.—Crying is one of the modes of expression of the child. Indeed, this, with the expression of the face, are, according to M. Billard, the only means of expression with which nature has endowed the young infant. This is, however, scarcely correct, since we may also class amongst its means of expression the various spontaneous muscular movements indicative of uneasiness, or of pain, or pleasure; the manner in which it drinks or sucks, whether eagerly and with appetite, or languidly, or carelessly, or not at all; the enjoyment it receives from pleasant sounds; and the evident delight it takes in regarding the light. Nevertheless, the cry and the expression of the countenance are the two means on which the physician must chiefly rely for early information of the occurrence of sickness in the young infant. These are the trusty sentinels of nature. By them she first gives notice of the approach of danger, and then measures the amount of mischief that may have been done.

The cry which a child utters during sleep, or even when awake, and when nothing has been done to excite or disturb it, is always indicative of some uneasiness. If the cry be caused by pain, or by any considerable disturbance, it will be accompanied by certain contractions of the features and movements of the body and limbs, which will still more strikingly show that the pain, or other exciting cause, is of a serious nature. Violent and obstinate crying is almost always caused by severe pain,—such as the pain of earache. Indeed, obstinate and long-continued crying, lasting for hours, is rarely met with except from one of two causes, earache or hunger. The cry of earache is often incessant and unappeasable, the pain being generally constant, and not paroxysmal, as are most other pains. It is to be silenced only by the application of remedies to the ear, or by the internal administration of opiates. We have known an infant, three months old, to scream with earache for two days and nights, with only short lulls of a few hours when brought under the influence of large doses of laudanum. As soon as the ear began to discharge, the cry ceased. We are constantly called to see infants and young children who have been crying most violently for hours, and who are thought to have colic, or to have hurt themselves, but who are, in fact, tortured with that most violent of all pains, earache. We have met with few instances in which such severe and *constant* crying has depended on other causes; for, though children scream violently and obstinately from hunger and thirst, they may always be quieted by the supply of either want, whilst in earache the infant generally refuses the breast, or takes it only for a few instants, and then lets go to resume his almost automatic scream.

To show the difficulty of sometimes determining the cause of crying, we may mention that one of us once attended a nursing baby through a severe attack of bronchitis. Just as the child was recovering from the attack, it began to cry without any apparent cause. The cry was so constant, violent, and severe, that, feeling certain from the symptoms that it could not be from any dangerous cause, we concluded, by the method of exclusion, though, to be sure, there was neither tenderness of the ear to touch, redness or swelling of the meatus, nor discharge, that it must be an earache. Hot applications and opiates applied to the ears did no good, and the constant scream set the mother half wild. At length, the grandmother came in and said she thought the child wanted the breast. Sure enough, there was the trouble; the child lay at the breast almost continuously for twenty-four hours, and earache, crying and all, vanished.

In not a few instances we have thus known infants to cry very often in the day and night, and sometimes very obstinately, too, from hunger. In such cases the child is thought to have colic, and as it is not unfrequently costive, it is dosed with cathartics, carminatives, and opiates; or, it is being brought up partially or wholly upon artificial diet, and as a consequence, has some disorder of the bowels, which is thought to require other kinds of medicaments for its relief. When the stools are natural in appearance, or merely costive, and when the child does not labor under flatulence, it is easy, by careful questioning of the mother, to discern whether she has milk enough, and by examination of the size and weight of the child, to judge whether growth and nutrition go on in their proper ratio; and if it be found that the mother is a poor nurse, and that the development of the child is slow and imperfect, we should at once direct an additional supply of nourishment, and the suspension of all mere drugs. We have often been surprised and delighted to find how soon, under the new treatment, the child becomes placid and comfortable, how well and how long it sleeps, and at what a rapid rate it develops its form and size. So, when the circumstances above referred to coincide with a somewhat disordered state of the bowels, we should first choose for the child the diet most appropriate to its age and state of health, and then, if after inquiry it appears that the whole quantity taken in the twenty-four hours is below the proper standard, the amount allowed must be augmented.

The crying occasioned by pain in the head, by the pain which accompanies pneumonia or pleurisy, or that which is attendant upon abdominal inflammations, is never scarcely constant, though it may be violent while it lasts. Pain in the head usually causes a sudden and sharp cry or shriek, which is over as soon almost as heard, and which has been called the hydrencephalic cry. The pain of pneumonia, which, it should be remarked, is not unfrequently absent, or so slight as not to be noticed, commonly occasions crying only during coughing, and for a short time after, and is accompanied by distortion or grimacing of the features. In pleurisy, again, the cry is also heard generally at the moment of coughing, but it is produced also by the act of moving the child, and by pressure on the affected side. It is commonly much louder, shriller, and indicative of greater suffering than in pneumonia, and in some cases that we have seen, has been very frequent and difficult to appease.

The cry of intestinal pain may almost always be recognized by the fact that it takes place just before or after a stool, that it is accompanied by wriggling and twisting movements of the trunk, and especially of the pelvis, or, in very young infants, by its coincidence with more or less flatulence, which is revealed by a tympanitic condition of the abdomen, and by frequent regurgitations of gas.

Children not unfrequently cry much and very obstinately from mere fretfulness and general distress or malaise. This kind of crying may be recognized by its peculiar tone, which is short, sharp, and irritable. It is a fret rather than a scream; it is occasioned by the least disturbance offered to the child, by the attempt to move it, to dress it, to attend to any of its wants, even to look at or notice it; it is moreover possible, generally, to still such a cry by soothing treatment, or by the endeavor to amuse the little thing with toys.

Lastly, a child will sometimes attempt to cry, but is unable to utter any or only a very faint sound. This depends commonly upon some laryngeal impediment, but may be also the result of pure exhaustion; there is not sufficient strength to sound a cry.

The cry of the young child has been divided by M. Billard into the cry proper and the return; and inasmuch as these two portions of the cry are differently affected in different diseased conditions, it is important that we should be aware of their existence, and of the effects produced upon their manifestations by disease.

The cry proper is produced during the act of expiration, while the return occurs during inspiration. The cry proper is sonorous and prolonged, the return is much shorter and sharper. The return is feeble in young infants, and becomes stronger as they advance in age. In different states of health, the mode of crying will vary to a considerable extent. The cry may exist alone, or in combination with the return; or again the return only may be heard, whilst the cry is from some cause suppressed. The distinction between the two portions of the cry may always be distinctly perceived in a child who is crying violently from any recent cause, whether ill-temper, fright, or pain, unless one or other has been suppressed by some morbid condition which interferes with the perfect performance of the vocal function. After a time, however, when the infant has become fatigued with its efforts, the cry proper ceases in part, and we have only the return, which is heard from time to time between the sobs. According to M. Valleix, it is the return which becomes enfeebled and disappears first, whenever one portion only of the cry is heard. Towards the fatal termination of all diseases, the return ceases more or less completely, and the cry assumes a peculiar moaning or murmuring, which must be familiar to all who have been much in the sick-rooms of children.

With a remark upon the condition of the lachrymal secretion in disease, we shall conclude this division of the subject.

The infant does not begin to secrete tears until towards the third or fourth month, and of course this function can furnish no sign previous to that time. After that period, however, the suppression of this secretion becomes, according to M. Trousseau, a valuable aid to prognosis, as this suppression occurs generally in all dangerous acute diseases. The occurrence of this symptom in any acute case should be looked upon, therefore, as one of dangerous augury, while the continuance of the secretion, or its reappearance after it has been suppressed, is, on the contrary, a highly favorable omen.

General Appearance of the Child; Development; Embonpoint; State of the Skin, etc.—While occupied in hearing the account of the sickness given by the mother or attendants, and even while asking questions in regard to the present state of the patient, the physician may learn a great deal that is useful, by an attentive observation of the general appearance of the child as it lies before him. He should study its size and development, its state of embonpoint or emaciation, its decubitus and gestures, the color, temperature, and dryness or humidity of the skin, and the presence of eruptions or swellings of any kind. Having remarked these various matters during the early part of the examination, he should proceed to inspect carefully the whole external surface by touch and sight, in order to acquire precise and accurate information upon these points.

A child who has been healthy from its birth ought to have attained a certain average size and development at a certain age. If it be much below the average size, if at three months it look like a new-born child, or at a year old like one of six months, it is very clear that something has acted to determine such slow and insufficient growth, and it becomes the business of the practitioner to discover what the impeding cause has been. Not only ought a child to have a certain size and stature, but it should also be possessed of a certain degree of embonpoint. A perfectly healthy young child, one under four years of age, usually presents a much greater fulness and rotundity of the trunk and limbs than does the adult. Its tissues are firm and solid, its surface of a cool and pleasant temperature, its coloration of a clear and exquisite white, finely tempered with a faint rosy tint in a warm atmosphere, or slightly marbled with light bluish spots in a colder air. Few marks more certainly indicate a healthful temper of the constitution than the clear and exquisitely-tinted pink color of the palmar and plantar surfaces of the hands and feet of a young child. Nothing, indeed, can be more beautiful or perfect in shape or contour than the figure of a fine hearty young child; nothing more pleasing to the eye than its delicate but vivid coloring; and nothing more expressive of the fulness of health and vitality than its whole appearance.

When, therefore, instead of these marks of a pure and active state of the health, we meet with stunted growth, emaciation, soft and flaccid tissues, sallow and dingy tint of the cutaneous surface, pallid or bluish feet and hands, weak and listless movements,—how easy the conclusion that some jarring agent is at work to hinder and obstruct the machinery of life.

In acute diseases emaciation takes place rapidly, but the tissues still retain some degree of elasticity and firmness. In chronic diseases the emaciation is of course slower, but it is more complete, so that, in some instances, the frame seems to consist merely of the bones wrapped round with a dark and unhealthy skin. The tissues beneath the skin, the cellular, adipose, and muscular, are in great part absorbed, and the skin falls into wrinkles and irregularities on the least movement of the child. In some cases of disease, and particularly in those of the abdomen, the derm loses almost entirely its elasticity, so that when pinched into a fold by the fingers, it retains for some time the form that has been given to it.

The *decubitus* and gestures of the child ought to be noticed. Healthy children are, when awake, almost always in motion. Those who have attained the habit of walking are tempted to active exercise by their various plays and amusements. Infants, though they sleep much more than older children, are also, when awake, constantly moving their limbs; they are seldom still. When asleep they rest quietly and comfortably, generally upon the side, though often upon the back. How different when the child is laboring under disease of any kind! The disposition to movement is gone; the older child insists upon lying on the lap, or in the cradle or bed, and the infant is to be soothed of its crying and fretfulness only by rocking and fondling in the arms. Instead of the free and spontaneous movements of health, we now see only the sudden, impatient, and causeless tossing on the bed or lap, or the constant changing of position, with fretting or complaining, which constitute the *agitation* of sickness; or else the slow, languid, and hesitating movements of weakness or prostration; or lastly, the stillness and immobility of stupor or of coma.

There is nothing peculiar about the decubitus of pneumonia or bronchitis except when there is severe dyspnœa, in which case the child, if old enough to select its own position, lies high upon the pillows, while those who are younger evidently prefer to rest on the lap of the nurse, with the trunk and head supported in her arms, and express by crying and agitation their discomfort and uneasiness when placed in the recumbent position on the lap, or in the cradle or crib. We have seen several young children affected with severe bronchitis or pneumonia, who have preferred to any other position that of being held in the nurse's arms, with the front of the chest placed against her chest, and the head hanging over her shoulder. When the dyspnœa is so severe as to produce, by slow degrees, a partial asphyxia and consequent dulness of perceptivity, the child becomes soporous or comatose, and lies usually upon the back, as in diseases attended with prostration of strength.

In pleurisy and peritonitis the decubitus is usually dorsal, and the child dislikes to be moved or nursed, often crying violently when touched or disturbed.

In intestinal inflammations the young patient is usually excessively restless at first, and very fretful, unless the attack be grave and threatening, when it often lies still for a time from the prostration of strength which attends violent attacks, but becomes restless, turns and twists in the bed, cries out, and agitates the lower extremities at each evacuation of the bowels.

In the early period of cerebral inflammation there is generally excessive restlessness, and great irritability of all the senses and temper, but as the case goes on, and passes into the stage of coma, the child becomes still and quiet, assuming very often the decubitus called by the French "*en chien de fusil;*" that is to say, on the side, with the inferior extremities strongly flexed, and the arms drawn close to, or crossed over the thorax. This position is especially characteristic of the latter stages of tubercular meningitis.

Extreme restlessness, constant tossing upon the bed, or incessant changing from the arms to the bed, or from bed to bed, is a very bad sign. We have observed it in several different affections; especially in obstinate pneumonia, in long-continued intestinal disorders, and in the secondary inflammations of measles and scarlet fever.

Amongst the gestures most deserving of attention are the sudden starts, attended with cries, which indicate the occurrence of some painful sensation, as that of colic, of stitch in the side in pneumonia and pleurisy, and sometimes of shooting pain in the head. The frequent carrying of the hand to the head, or to the ear, ought not to pass unnoticed, as this is often indicative of headache or earache. So also of the constant application of the hand to the mouth, or the introduction of the fingers into that cavity, which often occurs when the child is suffering the odontalgic pain of dentition. Nor should the physician ever neglect to observe any peculiar and especially any automatic movements of the limbs, and particularly of the fingers or toes. Nature often heralds the approach of a convulsive seizure by certain peculiar muscular movements. The thumbs are drawn into the palms of the hand, and the fingers clasped over them; or the toes are strongly bent towards the sole of the foot, or rigidly extended; sometimes the fingers are for an instant convulsively extended upon the hand and drawn widely apart from each other; or lastly, the muscular movements, instead of being easy, steady, and natural, are badly co-ordinated; they are irregular, uncertain, and tremulous. This latter character, tremulousness and uncertainty, we have often noticed.

The occurrence of paralysis will often be unperceived for some length of time by an inattentive observer. It is to be discovered by the failure of the child to move one limb, whilst the others are more or less agitated, or by taking hold of the limb, and comparing the total want of resistance in it, with a certain stiffness and opposition to movement almost invariably present in the healthful condition.

The state of the cutaneous surface is always important, and ought to be carefully and systematically examined. The points most requiring to be noted are its temperature, dryness or moisture, coloration, and the presence of eruptions or swellings. By the temperature, and dryness or moisture, taken in connection with the rate of circulation, we must judge as to the existence of fever. The inferences to be drawn from the condition of the surface in these respects are the same in children as in adults, and they need therefore no particular consideration in this place.

The coloration of the skin, on the contrary, owing to its great susceptibility to change in certain affections, becomes, in the diseases of early life, of very considerable importance in diagnosis, and deserves therefore some special remarks.

The physician should be aware, in the first place, that the color of a new-born infant is some shade of red, varying from a deep brick-red tint, to one of a much lighter hue. The red appearance fades away usually in about four or five days, and leaves the surface of a yellowish-white, or in some instances of a decidedly yellow color. The yellow color is sometimes so marked as to impose very readily upon an inexperienced person the idea that it must depend on an affection of the liver, or, in other words, that it constitutes a true jaundice. In a very large majority of cases, however, the conjunctiva retains its natural white tint, the digestive functions go on with perfect regularity, there is no fever, and indeed no marks of decided disorder of the health, so that the icterode hue cannot depend, under these circumstances, on any serious lesion of the liver or its appendages, and it is manifestly wrong to regard the case as one of disease, or as requiring any treatment.

Besides the yellow color just described, the cutaneous surface in children, and particularly in those under three or four years of age, very often exhibits different shades of a bluish color, which need some attention. When the whole skin assumes a decidedly blue tint, the case is one of cyanosis or morbus cœruleus, depending on some malformation or disease of the heart or lungs. In severe cases of this kind, the blue color deepens into a purple or even blackish hue. If this appearance last more than a very few days, there can be little doubt that it depends on some malformation or disease of the heart.

It is quite common to observe in new-born and very young infants, a bluish tint of the hands and feet, and of the parts around the mouth, whilst the rest of the body is pale. These appearances depend usually on some obstruction to the pulmonary circulation, as that caused by atelectasis pulmonum, bronchitis, or pneumonia, and they increase, diminish, or disappear, according to the course of the causative malady. In older children, the blue color of the skin is rarely of any considerable intensity, unless the condition has existed from birth, or soon after; but it is not at all uncommon to meet with faint, but quite perceptible shades of that color, depending on the asphyxiated state which occurs in croup, capillary bronchitis, pneumonia, and sometimes in laryngismus stridulus. It is hardly necessary to add, that a very slight blueness of the fingers and toes is sometimes observed in the cold stage of intermittents.

Occasionally we meet with an excessive harshness, aridity, and scurviness, with a wrinkled appearance of the skin, especially upon the abdomen and thorax. This symptom, when strongly marked, is usually attended with enlargement of the superficial veins of that part, and is then very striking even to a careless observer. It accompanies very generally the abdominal tuberculosis of children, and should not pass unobserved. Though generally indicative of tubercular peritonitis, or of tuberculosis of the mesenteric glands, it is not always so, since in a case that occurred to one of us, and in which it was perfectly well marked, a post-mortem examination showed it to have been caused by a chronic peritonitis, resulting from inflammation and suppuration of the mesenteric glands entirely independent of tubercular disease. The peritonitis had given rise to extensive adhesions amongst the intestines, and the pus had found its way by a tortuous sinus between the intestines into the vagina, through which it was discharged externally.

There is one other alteration in the color of the skin which is deserving of notice in a practical point of view. It is an excessive pallor, occurring sometimes in diseases which obstruct the respiratory function. We have been most struck with it in the capillary bronchitis, or suffocative catarrh, of young children, and in membranous croup. The whole surface assumes a dead white hue, which seems to depend on a total want of blood in the cutaneous capillaries. The nose is white, the ears become white and diaphanous, and the only relief the eye meets with in gazing upon what seems an almost alabaster countenance, is the still pink or bluish lips, the dark eyebrows and eyes, and perhaps a somewhat leaden tint of the circumference of the mouth and of the forehead. In strongly-marked cases the whole surface exhibits this white or blanched appearance, even the fingers and toes. When this condition has lasted for several hours, or a day or two, the hands and feet sometimes assume a bluish look, which may last until death occurs, or until the attack approaches a favorable termination. This condition of the surface, when occurring in cases attended with obstruction of the respiratory function, has always appeared to us an indication of imminent danger to the patient; and, indeed, when it lasts more than one or two days, it has very generally proved the harbinger of death.

The clinical examination of the cutaneous surface cannot be considered complete until it has been made with reference to the presence of eruptions, of swellings from œdema, of inflammation, tumors, and, lastly, of diseases of the joints. The inquiry in regard to the presence of eruptions is a very important one, from the fact that children are particularly liable to attacks of the exanthematous and other eruptive affections. Many attacks of sickness, beginning with violent fever and other serious symptoms, which would otherwise remain entirely obscure or unexplained, until a much later period from the onset, may be accounted for at an early period by a minute examination of the skin. So, in the latter stages of long and debilitating maladies, in the disorders which follow scarlatina, and in cardiac and hepatic diseases, a proper inspection of the surface will reveal œdematous effusions that might, if this search were neglected or carelessly prosecuted, remain undiscovered. The same remarks will apply to inflammations of the articular cavities, to the swelling of the joints produced by rheumatism, and to some obscure suppurative inflammations in the limbs of children. A most instructive example of the necessity of this close examination, occurred some years ago in the practice of one of us. A healthy male infant, five weeks of age, was seized suddenly with most violent fever, the reaction being not unlike in character that of acute rheumatic fever. The only visible disturbance of the health, to explain this violent attack, was a certain amount of digestive derangement, and for this the patient was treated. After three days of most severe illness, with strong tendency to convulsion, and with some stiffening of the lower jaw, we were asked to look at the right thigh. It was largely swelled, especially in its lower half; it was hard to the touch, and the skin over the outside of the limb, just above the knee, had assumed an inflammatory redness. It was clear that the child had been attacked with an acute inflammation of the deep tissues of the thigh, and that this was now approaching the surface and becoming visible. Careful inquiry now brought to light the fact that the baby, all through the sickness, had cried severely, as though in sharp pain, whenever it was moved, and especially when its napkins were changed. The distress observed when the napkins were being changed, had been ascribed to some smarting from the urine. Had the surface of the child been more carefully examined at an early period, the swelling of the thigh, and the pain on motion, might, no doubt, have been detected then, and the intense febrile reaction, with the nervous symptoms, which were thought too great for simple functional disorder of the digestive functions, would at once have been explained.

It is clear, therefore, that in infants and in children under six or even eight years of age, the physician must depend, in great measure, for information as to the nature of the case, on his own unassisted explorations; and, knowing this, he should leave nothing neglected that may aid him to gauge with accuracy the state of health of the individual before him. He should cultivate a *habit* of minute, systematic, and patient investigation, since, by accustoming himself to such a method in his daily walks, he will assuredly attain, in the end, a tact and sagacity that will not often be at fault.

THE PULSE.—The pulse of the child, in order to be judged of to any real advantage, must be examined during the state of quiet, and, if possible, it should be felt whilst the child is either asleep or dozing. During the waking state, a young infant is in such constant motion, that it is very difficult to perceive the pulsations of the radial artery, and impossible to judge of their force or volume, in consequence of the rising and falling of the flexor tendons of the forearm, and because, also, of the natural softness and delicacy of the pulse at that age. In older children, the moral disturbance occasioned by the visit of the physician in most instances, and the irritability and nervousness accompanying the sickness, will either cause the patient to resist the attempt to touch the arm, or else produce so great an effect upon the rate and force of the circulation, as to render very uncertain and unsatisfactory any conclusions to be drawn from the examination. If possible, therefore, the circulation should be examined during sleep. If this be impracticable, the child ought, when still nursing, to be put to the breast, or, when weaned, it ought to be quieted by soothing treatment, by toys, or by the promise of a toy.

It is essential that we should know what is the average of the healthy pulsations of the child, in order to obtain a standard of comparison by which to judge of any departure from that average in disease. Observers have varied not a little in the results at which they have arrived by their examinations upon this point. By selecting those, however, which appear to have been made with the greatest care, and under the most favorable circumstances, we shall, doubtless, obtain an average entirely worthy of confidence. It will be necessary, also, to obtain averages for different periods of childhood, since the rate of the circulation varies to a very great extent at different ages. We shall, therefore, give the rate of the circulation for new-born children (one to ten days old), for the period from four months to six years, for that from six to nine years, and for those from nine to twelve, and from twelve to fifteen years of age.

The average rate of the circulation in very young infants, is from one hundred and one to one hundred and two in the minute, the former being the result obtained by M. Billard in children from one to ten days old, as nearly as it can be gained from his statements, and the latter, the one obtained by M. Roger, in infants from one to seven days old (*De la Température chez les Enfants*, Paris, 1844). The physician ought, however, to be aware of the fact that, though the above is the average rate of the circulation at the age mentioned, the pulse may range very much above or below that average, without necessarily indicating a morbid state of the health. Thus, though the average frequency in forty children, from one to ten days old, observed by M. Billard, was one hundred and one, it was less than eighty in eighteen, whilst in fourteen it was between one hundred and one hundred and twenty-five, and in six between one hundred and thirty and one hundred and eighty. All these children, he assures us, presented every mark of good health.

The average frequency of the pulse during the first year may be stated at about one hundred and fifteen, at least such is the result obtained by us from an examination of seven observations by M. Roger of children from four to nine months old. This result, it will be observed, shows that the pulse is not so frequent during the first few days after birth, as it becomes at a somewhat later period, which, moreover, agrees with a previous statement to the same effect made by M. Valleix. This latter author is of the opinion that at seven months of age the pulse is much more frequent than some days after birth, and that it afterwards falls gradually as the child advances in years.

We are not acquainted with any observations upon the rate of the circulation during the second year of life, except those of M. Trousseau, who, according to M. Bouchut (*Manuel Prat. des Mal. des Nouv.-Nés*, p. 133, Paris, 1845), gives as the average between one year and twenty-one months, one hundred and eighteen.

M. Becquerel (*Traité Théorique et Prat. des Mal. des Enfants*, Paris, 1842), gives us the result of his observations upon thirty children, between two and six years of age, during sleep and in the waking state. During sleep the average was seventy-six; in the waking state, it was ninety-two.

Between six and nine years of age, the same observer found the average during sleep to be from seventy-three to seventy-four, whilst in the waking state it was ninety. Between nine and twelve years, the average was, during sleep, seventy-two, in the waking state, eighty. Between twelve and fifteen years the rate was seventy whilst the children were asleep, and seventy-two when awake. Roger gives seventy-seven as the average between six and fourteen years.

One very striking fact attracts our attention in the above statements: the much greater difference between the rate of the circulation during sleep and during the waking state, in very young children, than in those who are somewhat older. Thus, whilst there is a difference of seventeen pulsations in the minute, in the rate of the circulation during sleep and in those who are awake, between the ages of two and six years, the difference under the two conditions mentioned, amounts to only two pulsations in the minute in children that have reached the age of between twelve and fifteen years.

The circulation is somewhat more rapid in girls than boys. This difference should be borne in mind, but as it amounts to only about five beats in the minute, it is insufficient to be of any very decided value in diagnosis or prognosis.

After these specifications as to the rate of the circulation in children, we shall pass on to some general remarks upon the method of the examination of the pulse, and upon some other of its important characters.

M. Bouchut (*loc. cit.*, p. 129) remarks that in infants at the breast "the palpation of the pulse is almost impossible. It may be counted, but its force, feebleness, size, and hardness, can scarcely be appreciated;

the intermittent character is the only phenomenon upon which no doubt need rest; it is, moreover, the only one of any value." These opinions of M. Bouchut, though true in some degree, are much too strongly stated, for we are quite sure that it is very easy to detect great differences in the force, size, and tension of the pulse of the same child in health and in disease, and of different children laboring under different diseased conditions. These differences can be detected by careful observation from a very early age, and after two months may be readily recognized, when the variation from the state of health is at all considerable.

The intermittence of the pulse above alluded to, should rather be expressed by the word *irregularity*, since the pulse is not properly *intermittent*, but merely *irregular* in its rhythm. This is quite a common feature in the pulse of children, and, be it noted, is much more frequently met with during sleep than in the waking state. M. Becquerel met with irregularity of the pulse in twenty-four of one hundred and fifty children examined during the waking state, and in fifty-five of one hundred and fifty during sleep. It is clear, therefore, that mere irregularity of the circulation, independently of other symptoms, is not a sign of disease, since it was present in one-sixth of those awake, and in a little more than a third of those asleep. It should be observed, too, that the greatest irregularity exists when the pulse is lowest (in sleep). The chief practical bearing of this fact is that we should be careful not to lay too much stress upon slowness and irregularity of the pulse, as signs of tubercular disease of the cerebral meninges, unless they are observed during the waking state, and in connection with other symptoms, particularly with vomiting, constipation, and severe headache.

Another very important characteristic of the circulation of the child, is its extreme irritability, which causes its rate to vary to an extraordinary degree, even in perfect health. This is the more marked in proportion as the child is younger. The slightest disturbance, whether moral or physical, will cause the pulse to rise in a young child, from one hundred or one hundred and fifteen, to one hundred and twenty, one hundred and thirty, or even one hundred and fifty. From this circumstance may be drawn the inference also, that the pulse should always be examined, as before stated, during sleep, or during profound quiet.

There is still another reason which makes it necessary to touch the pulse during sleep or profound quiet. This is, that when the child is agitated, it becomes literally impossible, in consequence of the contractions of the flexor tendons of the arm, and of the movements of pronation and supination, to judge with accuracy the various qualities of the arterial action.

EXAMINATION OF THE HEART.—The examination of the heart by auscultation and percussion ought, and, to be of essential aid in diagnosis, must be performed while the child is still and quiet. It is best made during sleep, especially in infants; when this is impossible, it can be performed with great advantage during the state of quiet that follows nursing, or during that which may often be procured by soothing management, or by taking advantage of the fondness that infants show for a strong light, the view of which will generally suffice to occupy and keep them still.

The sounds of the heart present the same general characters in the child as in the adult. They are, of course, more feeble and more rapid: conditions which make it difficult, in the young infant, to perceive and appreciate any minute change from the healthful sounds. After the age of one and two years, however, when the circulation has become slower and more steady, the signs yielded by the physical examination of the heart become much more valuable and positive; so much so, indeed, as to yield results almost as important as in the adult. The first sound is almost always duller than the second. They succeed each other commonly with perfect regularity, and have the same interval between each, in the same child. The cardiac sounds are readily heard by placing the ear over the præcordial region. The extent of surface over which they may be heard, will depend on several conditions: particularly the state of quiet or agitation of the child, the presence or absence of fever, the state of the lung as to its consistence (constituting it a better or a worse conducting medium of sounds), and the condition of the heart itself as to health or disease.

In a healthy child, who is undisturbed by any cause of irritation, and particularly in one sleeping, the sounds are distinctly audible over the whole præcordial region, and under the left clavicle. In many subjects they can be heard over the whole front of the thorax, but become of course feebler in proportion as we recede from the præcordial region. Usually they are heard quite as distinctly under the right clavicle as over the right nipple of that side, in consequence, no doubt, of their transmission in an upward direction by the aorta. They are never heard over the posterior walls of the chest in children in perfect health, and whose circulation is entirely undisturbed. In those who are awake and agitated, and in those who have been making severe muscular exertions, the cardiac sounds are very loudly audible over the whole front of the thorax, and even through to the back of the chest.

When the lungs are indurated by inflammation, as in pneumonia, they transmit with great distinctness, from having become better conducting media, the cardiac sounds to the back. This circumstance sometimes becomes a valuable aid in the diagnosis of pneumonia. We have been enabled to satisfy ourselves of the existence of pneumonia in the lower lobe of the right lung, in a doubtful case, from the fact that the sounds of the heart were much more clear and distinct over the right inferior, than over the left inferior dorsal region.

The præcordial region is decidedly less sonorous on percussion than the parts of the thorax directly over the lungs. This diminution of sound is distinct enough to be evident to any ordinary ear, but it rarely amounts to absolute flatness. The region exhibiting this dulness of sound is the same in position as in the older person. It occupies the space corresponding to the cartilages of the fifth, sixth, and seventh ribs, and is situated therefore between the left nipple and the left edge of the sternum. Its measurements, as given by MM. Rilliet and Barthez, are one and a half to three inches in a transverse, by one and a half to two and a half in a vertical direction. The region of dulness is described by those observers as being represented by a circle or ellipse, the transverse diameter of which extends from the nipple to the sternum, or more rarely towards the xiphoid cartilage. In children over six years old the nipple sometimes lies above the middle line of this space.

THERMOMETRIC OBSERVATIONS IN CHILDREN.—As an indication of the intensity and character of the disease in febrile attacks, we have seen that the frequency of the pulse is little to be depended on. Dr. Forster (*Jour. f. Kind.*, July and August, 1862, in *New Syd. Soc. Year Book*, 1862, p. 413), who has made an extensive series of observations upon this subject, asserts that variations in the temperature of the body offer far more certain indications. The instrument used was a Reaumur's thermometer, eight and a half inches long, in which slight variations are easily appreciable. The bulb was placed in the axilla.

The results given are those of observations upon healthy children, during the first few days of life.

A constant lowering of the temperature of the body takes place after birth, which reaches its maximum, 28.97° R., on an average within the first two hours after birth.

| Hours after Birth. | Average Temp. (R.) | Minimum Temp. (R ) |
|---|---|---|
| ¼— 2, | 28.97 | 28.2 |
| 2— 6, | 29.12 | 28.1 |
| 6—10, | 29.49 | 28.7 |
| 10—15, | 29.53 | 29.0 |
| 15—20, | 29.31 | 28.8 |
| 20—25, | 30.04 | 29 7 |
| 25—30, | 29.9 | 29.7 |
| 30—36, | 30 07 | 29.7 |
| 36—42, | 30.04 | 29.4 |
| 42—48, | 29.86 | 29.3 |

A subsequent elevation always occurs. The average time at which the highest temperature was observed, was from thirty to thirty-six hours after birth, at which time the average was 30.07° R.: maximum 30.4° R., minimum 29.7° R.

This elevation was noticed equally when the infant had and had not taken food.

During the first nine days of life, the temperature was observed as follows:

| Days. | Maximum (R.). | Minimum (R.). | Average (R.). | No. of Observ'ns. |
|---|---|---|---|---|
| 1 —1½, | 30.4 | 29.7 | 30.01 | 22 |
| 1½—2, | 30.5 | 29.3 | 29.93 | 16 |
| 2 —2½, | 30 4 | 29.3 | 29.87 | 28 |
| 2½—3, | 30.3 | 29.2 | 29.74 | 16 |
| 3 —3½, | 30.3 | 29.3 | 29.76 | 27 |
| 3½—4, | 30.2 | 29.0 | 29 68 | 17 |
| 4 —4½, | 30.4 | 29.2 | 29.68 | 25 |
| 4½—5, | 30.3 | 29.2 | 29.72 | 18 |
| 5 —5½, | 30.4 | 29.2 | 29.82 | 28 |

| Days. | Maximum (R.). | Minimum (R.). | Average (R.). | No. of Observ'ns. |
|---|---|---|---|---|
| 5½—6, . . . . | 30.5 | 29.3 | 29.81 | 16 |
| 6 —6½, . . . . | 30 6 | 29.4 | 29.83 | 23 |
| 6½—7, . . . . | 30.3 | 29.1 | 29.75 | 17 |
| 7 —7½, . . . . | 30.4 | 29.3 | 29.82 | 22 |
| 7½—8, . . . . | 30.4 | 29.0 | 29.72 | 11 |
| 8 —8½, . . . . | 30.0 | 29.4 | 29.70 | 8 |
| 8½—9, . . . . | 29.9 | 29.6 | 29.75 | 2 |

We thus see that from the thirtieth to the thirty-sixth hour after birth the highest temperature is observed. Then a fall takes place, which reaches its maximum at four days after birth (average maximum 29.68° R.). Again, between the fifth and eighth days, a new elevation of temperature occurs; but this new elevation is less in degree than that previously noted. The average maximum was 29.83° R. Some differences were found in the results, according as the children were large and heavy, or the reverse. Large and well-developed children had a slightly higher temperature than those less robust.

Thus the average temperature in the early part of the day was, in children weighing eight pounds and upwards, 29.84° R.; but, in children weighing less than this, the average was 29.65° R. The evening observations, again, gave an average for the heavy children of 29.94°; for the others, of 29.77° R. Respecting the temperature at different times of the day, observations showed that, from the second to the ninth day, there was an average elevation of temperature, from morning to evening, amounting to .11° R.: the average morning temperature being 29.75° R.; the average evening temperature, 29.86° R.

This interesting subject has been further examined in regard to older children, by Mr. Finlayson (*Proc. of Manchester Med. Soc.*, in *Brit. Med. Jour.*, Jan. 16, 1869, p. 59).

His results are based on two hundred and eighty-one observations on eighteen different children, of ages varying from twenty months to ten and a half years, and are as follows:

1. The daily range of temperature is greater in the healthy child than that recorded in healthy adults—amounting to 2° F.
2. There is invariably a fall of temperature in the evening, amounting to 1, 2, or 3 degrees.
3. This fall may take place before sleep begins.
4. The greatest fall is usually between 7 and 9 P.M. (at least under the conditions of life in hospital).
5. The minimum temperature is usually observed at or before 2 A.M.
6. Between 2 and 4 A.M. the temperature usually begins to rise, such rise being independent of food being taken.
7. The fluctuations between breakfast and tea-time, are usually trifling in amount.
8. There seems to be no very definite relationship between the frequency of the pulse and respirations, and the amount of temperature; the former being subject to many disturbing influences.

**Respiration; its Rate and General Characters.**—The respiration, like the pulse, to be examined with any advantage to the explorer, must be investigated whilst the child is still and quiet. In the young infant it should be done during sleep, as it is only then that we can find the breathing uninfluenced by disturbing causes other than those connected with deranged health. In the older child, the play of whose functions is more steady and regular, and less readily jarred by trivial causes, this part of the clinical exploration may be made during the waking state; but, still, it must be done whilst the patient is quiet and tranquil, else the results obtained will necessarily be less certain and reliable than under the opposite state of things.

The respiration ought always to be counted by the watch, if possible, especially by the young practitioner. This is the only mode in which a perfectly accurate idea of the frequency of the respiration is to be obtained. It sometimes happens that a greatly increased rate of the breathing will pass unnoticed by the physician, from the fact that it continues to be regular and without effort. We have known children to breathe eighty times in the minute, without presenting any appearance of labor or effort in the act; without cough, and without the least wheezing or sound to be heard at a short distance from the patient. Under these circumstances, the great rapidity of the respiration might very well pass unnoticed, especially by inexperienced practitioners; and, be it remarked, this would be particularly apt to happen were the attention of the physician addressed to some other part of the economy than the thorax, as the seat of the sickness. For instance, in latent pneumonia, when this simulates meningitis, or when it is conjoined with gastro-intestinal symptoms, the failure to note a greatly increased rate of the breathing, might very well occur. In many cases of secondary pneumonia, it might also take place. In children, who have been long sick with diseases that debilitate and impoverish the health, a sudden aggravation of the symptoms dependent on collapse of the lung, might be misunderstood and falsely explained, for the want of this precaution. It is therefore a good and useful rule, for the young practitioner always to count the respiration, when he has to do with a case presenting the least obscurity of diagnosis, since this simple habit may guide him to the real seat of disease, which else he might mistake.

The rate of the respiration in children is very different at different ages, a circumstance that should always be recollected in the examination of their diseases. The average frequency of the breathing in new-born children and during the first week of life, is thirty-nine, according to M. Roger. It may rise, however, upon very slight disturbances, to fifty, sixty, or even eighty, while it is not at all unusual to find it at twenty-five or thirty in perfectly healthy infants during sleep. Between the ages of two months and two years the average is about thirty-five. Between two and six years, the average is eighteen during sleep and twenty-three during the waking state; from six to twelve years, the average during sleep is eighteen, and in the waking state twenty-three; from twelve to fifteen years, it is eighteen in the former, and in the latter twenty. It will be observed, therefore, that after the age of two years, the rate of the respiration is nearly the same throughout the remainder of the period of childhood; it changes so little, indeed, that the same average will answer for all practical purposes throughout that period.

The other characters of the respiration require some attention on the part of the practitioner. In the first place, the diaphragm plays a more important part in the process in the child than in the adult. In the young infant, indeed, the function is carried on almost wholly by the action of that muscle, so that the respiration is correctly described by the technical term of abdominal. The walls of the chest are almost motionless. On this account the rate and characters of the breathing can be best studied in young children, by examining the abdomen, the movements of which being strong and marked, are much more easily seized by the eye than are those of the thorax.

During perfect quiescence, and especially during sleep, the breathing of a young child is soft, regular, though less so than in the adult, and perfectly noiseless; it is necessary to place the ear close to the face or chest of the child, and to listen attentively, in order to hear it. In the young child, and especially the young infant, the breathing is, in the waking state, very different from that of the adult. It is short, irregular, uneven, and marked by occasional pauses, followed by a hurry and precipitation of the movements. These peculiarities in the respiration of the infant appear to depend on the weakness and imperfect action of the muscular apparatus at that early age, which causes the various movements of the body to be hesitating and uncertain, and without that steadiness and evenness which are characteristic of matured strength. After the age of two years, these irregular and tumultuous movements cease, and the breathing becomes more regular and even, like that of adults.

In the inflammatory affections of the lungs,—pneumonia, bronchitis, and pleurisy,—the respiration is almost invariably accelerated. In extensive pneumonia, and in capillary bronchitis, it becomes very rapid, rising to eighty or one hundred in the minute. In pleurisy and simple ordinary bronchitis, it seldom becomes so frequent, not exceeding, usually, forty or fifty. In severe pneumonia, the rhythm of the movement sometimes becomes inverted: the pause occurs at the termination of the inspiration instead of the expiration. The patient makes first a violent and labored expiration, bringing into a kind of convulsive action all the expiratory muscles of respiration; instantly after the expiration follows a rapid and full inspiration; then occurs a momentary pause, and again the respiratory act begins with the labored expiratory effort. This kind of respiration is a very unfavorable symptom, as it is indicative of a most dangerous oppression. It is particularly apt to occur in infants, and very young children. It has been called *expiratory* respiration.

The respiration, though almost invariably accelerated in pulmonary inflammations, sometimes retains its normal rate, or even falls below that rate. This occurs, we believe, only under one condition of things: when the forces of the constitution have been sapped by previous disease, or exhausted by the long continuance of the thoracic inflammation. It is therefore met with in cases of secondary inflammations, and in those of the chronic form.

The respiration is very much increased in frequency as a general rule in the form of disease recently described under the title of Atelectasis Pulmonum, or collapse of the lungs. When, therefore, a young child who has been exposed to the causes of this disease (feebleness at birth, exhausting disease, or debilitating hygienic conditions), is suddenly seized with hurried respiration, slight cough, paleness or blueness, with coldness of the cutaneous surface, and in whom there are but few and unimportant physical signs of pulmonary disease, there is very good reason for supposing that some portion or portions of the lungs have become collapsed, or in other words, have ceased to admit air.

The respiration often lends some assistance in the diagnosis of cerebral affections. In acute meningitis, accompanied by violent febrile reaction, it is more frequent than natural, but often irregular. When the early stage passes into the stage of coma, the breathing becomes slow and irregular. In tubercular meningitis it is seldom increased in frequency except for a day or two before death, whilst in the middle period of the disorder, it is either continued at its normal rate, or becomes slower. During that period, also, it is almost always extremely irregular, and is interrupted by long and mournful sighs, which, to the ear of the experienced physician, who hears in them the almost certain prognostic of approaching death, have an inexpressibly touching sound, increased tenfold by the consciousness of his utter inability to control the fatal tendency of the malady.

There is a peculiarity of the respiration which occurs in collapse of the lung, and also in cases of membranous croup, which ought not to be passed by unnoticed. It is, that, during the inspiratory effort, the ribs move inwards and backwards towards the mesial line of the trunk, instead of outwards as in normal respiration; and at the same time there may be recession of the lower part of the sternum, so that a more or less deep sulcus is produced around the base of the thorax. This peculiarity is readily explained, as shown by Rees and Jenner, by reference to the normal relation which exists between the current of inspired air, the expansion of the lungs, the descent of the diaphragm, and the firmness and resistance of the thoracic walls. If this relation be disturbed in any way, the phenomena we are now considering may be produced. Thus if the diaphragm contract suddenly and violently, the lungs cannot expand with sufficient rapidity, and in order to prevent the occurrence of a vacuum, the thoracic walls must yield to the external atmospheric pressure at their least resisting part, which is, under normal conditions, at the base of the chest. The same result must occur, also, when the diaphragm contracts with only normal force, but when the calibre of the larynx is much narrowed, or again, when a considerable portion of lung tissue is collapsed. In the article on rickets, an affection in which the firmness of the chest-walls is much diminished, a full account will be found of the masterly manner in which Jenner has applied the above principles to the explanation of the deformities of the thorax so characteristic of that disease.

AUSCULTATION AND PERCUSSION OF THE LUNGS.—This portion of the examination of the sick child ought to be performed, if possible, whilst the patient is still and quiet. Unfortunately, however, it happens in a large majority of cases that the disturbance of position necessary to effect the exploration, and the presence of the physician, together with the irritability of nerves and temper occasioned by sickness, almost always cause more or less resistance on the part of the child, and produce violent screaming and struggling. In young infants we have to contend only against the instinctive resistance to any physical disturbance naturally attendant upon sickness and suffering. In older children, who have learned to distinguish between familiar and strange faces, and in whom the will has begun to act, there is added to the instinctive resistance of the infant an opposition of the most strenuous and annoying kind, founded upon the natural fear of a stranger, and upon a mental determination not to be interfered with or incommoded by the movements and changes of position necessary for a careful examination.

For these reasons, the physical exploration of the chest in young subjects is often to be accomplished only with great difficulty, and in the midst of the most violent screaming, struggling, and contention. It is clearly important to avoid these obstacles if possible. This can only be done by the employment, on the part of the attendants and physician, of the most soothing, gentle, and patient management; and in this way, let it be remarked, it can be done in a large majority of cases. The possession by the physician of a quiet and yet decided manner, the power to interest and attract the child by entering with active sympathy into its little amusements and pursuits, the skill to engage its attention by the exhibition of some book or toy, or the mere influence he may exert to calm its terror or excited irritability, by a soothing voice and gentle persuasion, will, in many instances, overcome any resistance offered to the examination by children over two years of age. Nevertheless, in very young children, and in not a few that are older, no gentle means whatever will overcome opposition. Here the exploration must be made in the midst of struggles and cries, and though the results obtained will be less clear and positive than when the child is reasonable and obedient, a great deal of most valuable information can be acquired by a quick and dexterous practitioner. The percussion can be made in the short intervals between the cries, or even during their continuance, and by placing the ear close to the finger by which it is performed, the sounds elicited can be very well heard and judged. The auscultation is more uncertain; but, by watching intently the long and deep inspirations which immediately precede the violent cries, the presence or absence of râles, and their characters, the degree of freedom with which the air enters the lung, and the existence or non-existence of bronchial respiration, can, after some experience, be ascertained and commented upon, so as to give considerable certainty to the diagnosis.

The particular position in which to place the child, during the examination, is of some importance. After the age of three and four years the position may be the same as that selected for the adult, if only the patient be reasonable and tractable. When, on the contrary, the child resists, it should be taken on the lap of the mother or nurse, or else held in the arms, with the head inclined over one shoulder, while its back is presented to the practitioner. Infants within the year may sometimes be examined whilst engaged in the act of sucking; but this is inconvenient, both from the constrained position, and from the circumstance that the inspirations are short and imperfect during that act. The French authors recommend that the very young infant should be laid, with its face downwards, across the hand of the practitioner, who is then to approach the back of the chest to his ear. We have found either one of the three following positions most convenient, as the case may be: the infant laid across the lap of the mother, with its face downwards, and the head hanging a little over one knee; held in the arms, with the front of its body placed against the mother's chest, and the head lying over her shoulder; or, lastly, a favorite position of ours, placed in a sitting posture upon the lap, supported by one hand in front, and by the other holding the occipital portion of the head.

Auscultation should always be performed before percussion, because the latter generally alarms or annoys the child, and occasions crying, which of course would interfere more or less with the auscultation, were this performed after percussion. The auscultation should be made with the ear rather than the stethoscope, for the reason that the instrument terrifies the child, and also because it cannot, when the child resists and struggles, be kept in contact with the chest. Moreover, the instrument is unnecessary except for the examination of the upper portions of the thorax in front, and it had better, therefore, be dispensed with.

Percussion is best made in children by using a finger of the left hand as the pleximeter, and by striking with one finger of the right. One finger is quite sufficient to elicit all necessary sound in young subjects. The strokes should be light and distinct, consisting of short, quick, and gentle taps.

To perform auscultation and percussion with success, the surface ought to be quite uncovered. The habit of examining the thorax through one, or several thicknesses of clothing, which some persons fall into, is a most careless one, and cannot but lead to uncertain and erroneous results.

As a general rule, it is sufficient, in young children, to examine the posterior portion of the thorax. Doubtless, it is more accurate and artistical to explore the whole chest, and this ought to be done in all obscure cases. But when the child is sick and suffering, when it is irritated and exasperated by the presence of a stranger, or by coercion, and still more, when it is weak and exhausted by long or violent illness, it becomes of the greatest importance to shorten, as much as possible, the time occupied in the examination. For these reasons, it is well to be aware of the fact that, in nearly all inflammatory diseases of the lungs, the morbid changes affect first and most severely the posterior surfaces of those organs. This is thought to depend on the fact, that the child passes so large a portion of its time in the recumbent position as to cause the fluids of the body to gravitate towards the dependent parts of the lungs, and thus to determine the beginnings of inflammatory action in that direction. Certain it is, be the explanation what it may, that it is rare to find the anterior surface of the lungs affected either with bronchitis, pneumonia, or pleurisy, the posterior surface remaining healthy. When, therefore, upon auscultation and percussion, no signs of disease are met with over the dorsum of the thorax, we may feel pretty well satisfied that the lungs are healthy. Nevertheless, in all doubtful cases, the examination ought to be extended to the whole chest, in order to make what was, before this has been done, only a strong probability, a certainty. Whenever, also, it is important to ascertain the precise amount of disease in any serious or long-continued sickness, the front as well as the back part of the chest must be examined.

The *respiratory sounds* are not of the same character precisely in the child as in the adult, and of this the physician onght to be aware. In children the vesicular murmur is stronger than in the adult, so that it assumes somewhat of a blowing or bronchial sound. It was in consequence of this peculiarity that Laennec gave it the name of puerile respiration, which, though a mark of health in early life, is, at the period of maturity, an indication of a morbid change in some portion of the pulmonary parenchyma. It ought to be remarked, however, that in infants under two, and particularly in those under one year, the vesicular murmur is, in ordinary respiration, weaker than in adults; owing, no doubt, to the fact that the inspirations are short and imperfect, not distending the lungs to their full capacity. When, however, from any cause, a sigh, a sudden disturbance, or the act of crying, a full and complete inspiration takes place, so as to dilate thoroughly the pulmonary structure, the murmur becomes at once loud and strong, or, in other words, *puerile*, as in older children.

The murmurs of inspiration and expiration bear the same relation to each other as in the adult; the expiration being much shorter and feebler than the inspiration, though, at the same time, it, like the inspiration, is louder than in the adult. In some instances, however, and especially over the posterior inferior and lateral regions of the thorax, no sound whatever is heard during the accomplishment of the expiration. This absence of sound during expiration is the more apt to be met with in proportion as the child is younger.

When a young child is made to breathe forcibly and rapidly, the respiratory sounds assume certain characters, even in perfect health, which might mislead an inexperienced observer. The inspiration is short, loud, and hard, so as to assume somewhat of a blowing character, resembling not a little the sound of bronchial respiration. At the same time, the expiration becomes louder also, and longer, which two circumstances, rude or even blowing inspiration, with loud and somewhat prolonged expiration, may very well deceive a young or careless practitioner.

The respiration is most clear and characteristic over the anterior, lateral, and posterior inferior regions of the thorax. Over the origin of the larger bronchia, that is to say, in the interscapular region, the respiration is very strong, so as to resemble very closely bronchial blowing. Here, also, the expiration is often very marked; it is sometimes heard as long, or even longer than the inspiration. Over the scapulas, the sound of respiration is always feebler than elsewhere, except in the præcordial region, from the interposition of the scapulas and of thick muscles between the ear and the lung.

*Percussion* yields a much louder and more sonorous sound in children over two years of age than in adults,—a circumstance always occurring coincidentally with the presence of puerile respiration, and dependent on the fact that the function of respiration is, at that age, very active, and the lungs therefore filled to their utmost capacity with air. In infants under two years of age, the sonorousness varies to a considerable extent in the same child. When the respiration is, as it usually is, gentle and easy, the inspirations being rather feeble and incomplete, the amount of air contained in the lungs will be somewhat deficient in comparison with what their cells might contain, and the sound yielded upon percussion will necessarily be rather dull and insonorous. When, on the contrary, the respiratory process is quick, active, and energetic, from any cause, so as to give rise to the auscultatory phenomenon called puerile respiration, the percussion will be loudly sonorous, as it is in the later periods of childhood, owing to the thorough dilatation of all the air-cells, and the consequent presence in the thoracic cavity of a large amount of air.

The sonorousness of the thorax is different in different parts in children, as in adults. In front, the percussion is most sonorous from just beneath the clavicle on the right side down to one or two inches below the nipple, where it gradually becomes dull, owing to the position of the liver. On the left side the sonorousness is modified by the presence of the heart in the manner already mentioned. Below the præcordial region we again have pulmonary resonance down to the sixth or seventh ribs, below which is heard the tympanitic sound of the stomach.

Behind, the sound is very dull above the spine of the scapula, and considerably so over the scapula beneath its spine. Over the interscapular space it is clear and strong, and more so in the lower than in the upper half. Beneath the inferior angle of the scapula, likewise, it is clear and full, until we approach the inferior margin of the thorax, where it is dulled, even above the lower edge of the lungs, by the presence beneath of the liver on one side and of the spleen on the other. Over the right side the dulness begins a little higher than over the left, in consequence of the greater bulk of the liver than of the spleen.

The lateral regions are very resonant in their upper portions, but become dull as we approach the liver on the right side and the spleen on the left. On the left side the pulmonary sound is often entirely eclipsed by a tympanitic resonance occasioned by the presence of gas in the stomach.

In practising percussion in children it is necessary to strike gently, because, from the great natural sonorousness of the chest in early life, any considerable force would bring out so much sound as to prevent the recognition of a degree of dulness which might readily be perceived by the use of more gentle blows. It is necessary always to compare the two sides together as in adults, since this often leads to the detection of a degree of impaired resonance which might be otherwise inappreciable. Yet, and the physician ought to be well aware of this, the comparison of the two sides is not quite so useful in young as in mature subjects, because of the fact that the diseases in which the differential comparison is most important, pneumonia and pleurisy, are more frequently double than in adults. It becomes, for the same reason, very important to compare the upper and lower portions of the thorax behind, since we may assure ourselves of the existence of dulness below, of which we were before doubtful, by the fact that the sound is less sonorous in that region than above, which is, as already stated, the very opposite of the healthy condition.

EXAMINATION OF THE ABDOMEN.—It is often very important to ascertain, by palpation, the form, size, and degree of tension of the abdomen, the presence or absence of effusions within its cavity, and the condition of the organs which it contains; to learn by percussion the degree of resonance which it affords; and, lastly, to find by pressure whether it be unnaturally tender to the touch or not. By a careful inquiry into these various points, and a proper comparison between them and the rational symptoms presented by the patient, we shall be able to discover the existence of tumors, of hypertrophied organs, of unusual developments of gas in the intestines, of dropsical effusions, of enlarged and hardened mesenteric glands, of gurgling, and of soreness on pressure, caused by inflammation of some of the contents of the cavity. The examination should be made, if possible, whilst the child is still and composed. It is best, therefore, to perform it before auscultation and percussion, in children who are old enough or amiable enough to be willingly quiet, since the length of the examination of the thorax often wearies out their patience, and they refuse to submit to further inspection; whilst, in infants and in children who obstinately resist the examination, it matters little at what particular period it is attempted, since it must be done at last in the midst of cries and general agitation. It is, at all times, a difficult and not very useful examination, unless the patient consents to it freely and without fear. It is very necessary, therefore, to resort to every means to obtain this quiet consent. In children over a year old, this condition is to be obtained only during deep sleep, during the act of nursing, or, when the patient is awake, by so pleasing and attracting its attention by toys, by soothing voice and manners, as to cause it to forget what is passing. The reasons why the examination is useless, unless made during a state of calm, are very obvious. In the first place, the contractions of the abdominal muscles give to the walls of the abdomen such a degree of hardness and rigidity, that it is impossible to learn anything in regard to the state of the parts within, except merely what can be learned by percussion; and, in the second place, no acuteness of perception will enable us to distinguish between the cries of anger and fright, and those that may proceed from pain occasioned by pressure.

M. Valleix recommends a plan in the case of young infants, by which tenderness on pressure may very generally be recognized. It is as follows: he carries the child, carefully sustained in the arms, suddenly before a bright light, either that which pours in at a large window during daylight, or that of a bright artificial light at night. The infant, whose greatest pleasure consists in gazing at a bright light, almost always ceases to scream and becomes perfectly quiet while thus attracted. Seizing this opportunity, the physician should pass his hand under the clothes, and applying it directly over the cutaneous surface, he may first learn, by a rapid palpation, the general characters of the abdomen, and then ascertain by sudden and decided pressure whether it be abnormally sensitive. If the pressure gives pain, the infant will cry out at the moment, while, at the same time, a sudden contraction of the countenance will assist to show the perception of some painful sensation. Should the infant, on the contrary, continue to gaze fixedly at the light, without noticing the manœuvres of the physician, it is fair to conclude that there is no inflammatory tenderness present.

EXAMINATION OF THE MOUTH AND FAUCES.—In all obscure attacks of sickness occurring in young children, and even in those who have attained to the faculty of speech, the physician ought to be most careful to inspect the condition of the mouth and fauces, since not a few cases of fever which seem at first view inexplicable, are at once made plain by this simple exploration. We were once called to see a child three years of age, who had been sick three days with fever, thought by intelligent and educated parents to depend on gastric derangement. A single look into the throat showed it to be completely clogged up with pseudo-membranous exudation, whilst a slight hiss in the inspiration, and a husky voice, declared that the same fatal product was just entering the larynx. The time for successful action had slipped by; the patient died two days after in the agonies of slow croup. On another occasion we were called to take charge of two children in one family who had been ailing several days with feverish symptoms, loss of appetite, languor, and some complaint of sore throat. In both we found the fauces covered with plastic deposit, and both died a few days after of membranous croup. Some years ago we attended a child between five and six years old, for a period of four days, with irregular fever, some vomiting, total anorexia, languor, indisposition to play, and rare complaints of pain in the *chin and neck*, that were not mentioned to us by the attendants, so that all the time we had the idea that the attack was one of gastric embarrassment. Greatly to our amazement and consternation, the mother informed us on the fifth day that she had seen something white in the throat, and upon examination we found both tonsils covered with whitish exudation. Happily the exudation was still confined to these glands, and we were able by appropriate treatment to prevent its further extension.

In croup, also, in whatever form it may make its attack, the fauces ought to be closely watched, in order to know by the presence or absence of false membrane, the probability or improbability of the case being one of the membranous kind. In scarlatina and measles, especially in the former, the throat ought to be examined each day, to ascertain its precise condition, and particularly to learn whether there be present any disposition to membranous, ulcerative, or gangrenous angina.

In young infants, also, the mouth requires a thorough examination from time to time in all their ailments, and especially in their digestive diseases, since they are liable to thrush, to aphthæ, and in chronic and debilitating maladies, to gangræna oris. In teething children the act of dentition requires that the mouth should be inspected occasionally in order to ascertain the state of that process, and to detect the existence of the form of stomatitis called ulcerative, which generally occurs between the ages of one and five or six years.

The mouth can be readily examined by pressing upon the chin with force sufficient to cause the child to separate the jaws. In the young infant this very generally produces crying, during which the mouth is widely opened, and the state of the cheeks, lips, gums, and tongue can be perfectly well seen. In an older child, who refuses to open the mouth, or to keep it open, the handle of a smooth silver spoon is the best instrument to employ by which to effect our propose.

The throat cannot be well seen at any age, except by depressing the base of the tongue, which is best done by means of a spoon-handle, as above directed. When a child refuses obstinately to open the mouth, and resists with violent struggles, it should be taken on the lap of a strong assistant, with the back of its trunk resting against the chest of the assistant, whose arms should restrain, by being crossed over the body and limbs of the child, its more vehement movements. Another assistant must hold the head of the child steady, whilst the physician obliges it to open the mouth, either by closing the nostrils with the fingers, or by slowly and gently, but firmly, insinuating the handle of the spoon between the teeth. After the spoon has once been passed over the tongue there is seldom any difficulty in obtaining a good view of the fauces.

The *introduction of the finger into the mouth* is of some use as a diagnostic means in the case of infants. It informs us of the temperature of that cavity, of the state of its secretions, and, consequently, of its dryness or humidity, and of the disposition and ability of the infant to suck. When an infant is in good health, it will almost always seize the finger, when this is placed in the mouth, and suck vigorously for some instants. It will do the same when it is only ailing with some slight malady, and in the early stage of more dangerous diseases. But, in severe and threatening illness, the infant either refuses to suck upon the finger at all, or does so only for an instant. When the mouth is irritated or inflamed, as in the various forms of stomatitis, the child will open the mouth and cry, and make no attempt whatever at suction. In stupor, and especially in coma, but little attention is paid to the finger, the infant being generally unconscious of its presence.

By watching the child when put to the breast, we may acquire nearly the same information as that just referred to, except that the child would naturally make a greater effort to seize the nipple than the finger, and would therefore nurse, even though the act of so doing were painful, under circumstances in which it might refuse to grasp the finger at all. The refusal to nurse, or the nursing but little at a time, may depend on other causes, however, than sore mouth. It often depends on some anginose inflammation. When this is the case, it may be suspected from the peculiar gulping manner in which the child swallows, and from the fact that swallowing often causes fits of coughing. It is caused also by dyspnœa. An infant laboring under severe oppression from pneumonia, bronchitis, or any other cause, never sucks well and steadily, but rather by fits and starts. The nipple is seized often with avidity, and two or three swallows are made in quick succession; then follows a pause to regain the breath, and then again the effort of deglutition. In a few cases attended with very great dyspnœa, that we have seen, the patients have been able to swallow only once or twice without pausing, and even then with very great difficulty.

MANNER OF TAKING DRINKS.—The remarks just made as to the inferences to be drawn from the manner in which the infant sucks, will apply also to the mode in which both infants and older children drink. A young child drinks continuously, without stopping to breathe. If, however, it have any disorder which accelerates the respiration, it will, after drinking a few mouthfuls, cease, jerk its head away from the cup or spoon, breathe irregularly and hurriedly, and cough. These symptoms ought to call attention to the respiratory organs. So, if a child, whose breathing is not oppressed, nevertheless drinks with difficulty, slowly, at intervals, and apparently with pain, there is reason to suspect some impediment in the pharynx, and the fauces ought thereupon to be carefully examined.

We may learn also from the manner of drinking whether the child is thirsty or not. When it drinks often and with avidity, and yet has a dry mouth, it is evident that there is very great thirst.

VOMITING AND THE DISCHARGES BY STOOL.—The physician should never think his examination of a sick child concluded until he has inquired as to the occurrence of vomiting, and as to the state of the discharges by stool. Not only, indeed, should he inquire as to these symptoms, but he ought by all means to inspect personally the appearance of the matters ejected. This is especially important in regard to the dejections, since no description of a mother or nurse, however intelligent, can impart to the physician the precise and accurate idea of the state of those discharges which even a very rapid inspection would give him.

Vomiting is of very frequent occurrence in infancy and childhood. Owing to the fact that the stomach is much less curved in its shape than in the adult, and that the œsophagus enters the organ close to its left extremity, vomiting and regurgitation take place with great readiness, and are, therefore, very common symptoms in the diseases of early life.

The young practitioner must beware lest he regard all kinds of vomiting in the infant as the result of disease. The nursing child is very apt to vomit, even when in the most perfect health, especially if it be suckled at an abundant breast. This kind of vomiting, however, may be readily distinguished from that which depends on some morbid state of the health, by the circumstance of the infant's ejecting nothing but the milk which it has swallowed, either just as it was drawn from the mother, or slightly curdled, and by the fact that it suffers no inconvenience whatever from the act,—neither any violent effort, languor, paleness, nor faintness. And yet we have known a young practitioner to prescribe antacids and absorbents to correct this kind of vomiting, which is most plainly an act of nature kindly intended to rid the infant of any excess of food it may have imbibed.

In older children also, vomiting not unfrequently occurs as a consequence of over-distension of the stomach with food. When, therefore, after vomiting, a child seems relieved and comfortable, when any unpleasant symptoms that may have existed prior to it moderate or disappear afterwards, it is fair to conclude that the act has been beneficial, and wrong to regard it as the signal of a necessity for giving medicine, or for regarding the child as a patient, except insomuch as to watch lest it be sick as an after-consequence of having had the digestive power overtasked.

Frequently repeated vomiting, attended with retching and effort, and with paleness and exhaustion, or with fever, always indicates some considerable derangement of the health. It is impossible to ascertain the precise cause of such vomiting, except by a proper consideration and comparison of all the symptoms the child may present. The cause may be in the stomach itself, consisting of an inflamed state of the organ, or it may be a simple indigestion without any inflammatory condition whatever; it may be that the cause lies in the intestine, being some inflammation, functional disease, or obstruction of that part; it may be pneumonia or pleurisy; it may be the approach of some of the eruptive fevers; or last, and most serious of all, the cause may be some commencing lesion of the brain, which, though as yet determining no proper cerebral symptoms, shall perhaps be destined, by its inevitable progress, to end the patient's life. The detection of the particular causative condition, in any of these forms of vomiting, can be arrived at only by a careful study of the whole constitution of the patient, both through the rational symptoms that may be present, and by a thorough inspection of the different systems of the body by means of the physical methods of diagnosis.

The rule to examine with his own eyes the napkins or cloths of the child, ought never to be forgotten by the practitioner, when there is any reason to suppose that the alimentary functions are at all deranged. The number of the stools in the twenty-four hours ought also to be ascertained, not loosely and carelessly, but precisely and with certainty. Without a close attention to these two precautions, it is impossible for the physician to obtain really useful and exact notions in regard to the nature of the disorder he is called upon to treat, or to judge of the degree of severity of the attack.

We shall not attempt to consider in this place, either the various unnatural appearances of the matters vomited, or ejected by stool, the amount of those substances, or the frequency with which the discharges take place, since these various circumstances can be treated of in the manner they require, only when we come to study separately the diseases of which they form a part.

We shall here conclude our remarks upon the methods to be pursued in the clinical exploration of the diseases of children. We have only to add the wish that those who shall honor them with their perusal, may find them of some real assistance in their subsequent studies of the affections of early life. They are intended, of course, chiefly for the student and young practitioner; but we cannot help hoping that they may possibly prove useful to some who have spent a longer time in the profession, but who have never, perchance, given any particular attention to the best modes of investigating the diseases of infants and children.

# CLASS I.

## DISEASES OF THE RESPIRATORY ORGANS.

## CHAPTER I.

## DISEASES OF THE UPPER AIR-PASSAGES.

### SECTION I.

### DISEASES OF THE NASAL PASSAGES.

### ARTICLE I.

### CORYZA.

**Definition; Synonymes; Forms; Frequency.**—Coryza is inflammation of the mucous membrane lining the nasal passages. It is called in common language, cold in the head, or snuffles. Underwood describes one variety of it under the title of coryza maligna, or morbid snuffles, which, he says, is very different from and a far more serious disorder than what is usually called snuffles. Dewees makes no reference to it. Eberle describes it under the title of coryza. He doubts whether coryza maligna ever occurs in this country, and takes his account chiefly from Underwood and Denman.

We shall describe three forms of the disease,—the simple, or mild, the severe, and the chronic. The severe form includes purulent and pseudo-membranous coryza. Simple coryza is very common at all ages; it occurs frequently as a distinct disorder, but still more frequently in connection with laryngitis, bronchitis, pneumonia, measles, scarlet fever, &c. The severe form of coryza is that which has been called by Underwood coryza maligna, or morbid snuffles. Purulent and pseudo-membranous coryza rarely occur as idiopathic affections, but are almost invariably connected with angina or other diseases. We met with one case, however, of the purulent form, unaccompanied by angina or other disease, in 1841, in a child seven weeks old. The case proved fatal. We saw another fatal case of the same form, connected with simple angina, in 1846, in a child five weeks old. Besides these two cases, we have met with four others of the pseudo-membranous variety, accompanied by simple angina, in children between two and six years of age, all of which terminated favorably. The two varieties of the disease occur, however, as already stated, much the most frequently as secondary affections in the course of other diseases, particularly measles, scarlet fever, pseudo-membranous angina,

&c. We shall not attempt in the present article to treat particularly of the cases which accompany the eruptive fevers.

CAUSES.—The only clearly evident cause of simple primary coryza, in most cases, is chilling of the body. Insufficient dress,—a very common error in this country,—too low a temperature of the nursery, and exposure to bad weather, may often be discovered to have been the causes of the attack.

The causes of the disease, in the two cases of purulent coryza above referred to, were unknown. In one the nurse remarked a slight discharge of blood from the nose soon after birth, and the coryza dated from that time. In the other, the patient, a feeble child, was attacked when two weeks old without any appreciable cause. The four cases of the pseudo-membranous form occurred in 1845 and 1846, during an extensive prevalence in this city of severe scarlet fever, measles, and pseudo-membranous angina and laryngitis, which makes it probable that they depended upon the epidemic constitution of the atmosphere. The cases of MM. Rilliet and Barthez coincided generally with primary or secondary purulent or pseudo-membranous angina. From the account given by Underwood of coryza maligna, there can be little doubt that it was epidemic when observed by himself and Denman. The latter author states that in connection with the coryza there was a general fulness of the throat and neck externally; that the tonsils were tumefied, and of a dark red color, with ash-colored specks, and in some cases, with extensive ulcerations; and that some of the children swallowed with difficulty: all of which symptoms clearly point to severe concomitant angina.

ANATOMICAL LESIONS.—The Schneiderian mucous membrane is found reddened uniformly, or in points, rough, thickened, and sometimes softened. When pseudo-membrane is present, it exists either in fragments, or lines the whole extent of the nasal passages, and is mixed with mucus or muco-purulent fluid, in greater or less quantity.

SYMPTOMS.—The symptoms of simple coryza are sneezing, dryness of the nose at first, soon followed by discharge, which is very small in quantity in the beginning, and more abundant afterwards, and more or less disturbance of the respiration. It is only in young infants that this form of coryza is a disorder of any consequence in itself. In older children it never injures the health by its own action; it is of importance merely as the sign that a cold has been taken, and ought to be regarded as a hint given by nature of the necessity of guarding the child more carefully in future. But, in infants at the breast, and very young children, it assumes much greater importance from the very considerable obstacle it opposes to the act of respiration. At this early age, in fact, coryza becomes a serious and even dangerous disease. If primary, it causes great distress and disturbance to the child, interrupting its sleep, interfering with the act of nursing, and, in some instances, so impeding the function of respiration, as to bring on slight, and more rarely, dangerous asphyctic symptoms. It may, undoubtedly, occasion, in weak and debilitated children, more or less extensive collapse of the lungs, an accident which will explain the imperfect performance of the hematosic function in some cases, where the only evident disease is this apparently insignificant one of coryza.

When simple coryza exists in connection with bronchitis and pneumonia, it adds to the severity of those diseases. In children over three or four years old, and particularly in those who are vigorous, it seldom gives any serious trouble. But in young infants, and in weakly children of any age, its influence upon the symptoms is often very marked. The effort to breathe through the nasal passages, when they are partially or wholly occluded by the inflammatory swelling of their lining mucous membrane, or by abundant and viscid secretions, fatigues, and wears away the strength of the child, exhausts its energies, and renders it less able to resist the pressure of the sickness. But not only this;—as in primary coryza, the entrance of air into the lungs is impeded, and the hematosic function is thereby interfered with, while at the same time, the existence of an obstacle to the full inspiratory movement, in addition to that which exists in the lungs themselves from bronchial or pneumonic disease, cannot but assist in the production of that collapse of the pulmonary tissue, which has been found of late years to coincide so often with the bronchitis and pneumonia of young children, and especially with the former.

The reason why coryza causes so much difficulty in young children is, that they persist in the effort to breathe through the nose in spite of the obstruction of the nasal passages. They seem to do this instinctively, not, apparently, having the power to carry on the act of respiration through the mouth, or but for short periods only at a time. The constant struggle to force the air through the nose, and the necessarily smaller quantity that reaches the lungs, are undoubtedly the two chief causes of the symptoms above described as occurring in the coryza of children.

SEVERE CORYZA begins with sneezing and stoppage of the nostrils, soon after which the discharge, which is the pathognomonic symptom of the disease, makes its appearance. This consists of serous or mucous fluid in greater or less abundance, usually of a yellowish color, and which, at first thin and without odor, becomes afterwards thicker and often purulent, with a peculiar, unpleasant, but not fetid odor. In other cases, on the contrary, and especially when the pseudo-membranous exudation is present, the discharge is thin, and often contains small granular particles, which seem to be the detritus of the false membrane, while at other times it is ichorous or even bloody. When false membrane is present, it can often be seen, upon examination of the nostrils in a strong light, to cover the mucous membrane in the form of thin adherent layers of a yellowish-white color. The alæ nasi, and sometimes the whole extremity of the nose, are red and swelled, and the skin, which is tense and shining, presents an erysipelatous appearance. The upper lip is generally reddened, irritated, swelled, and sometimes excoriated, by the nasal secretions.

The *respiration* is generally difficult, nasal, and snoring. When the nasal passages are nearly or quite filled with the secretions, the child being no longer able to breathe through them as in health, is compelled to keep the mouth open. This is exceedingly inconvenient to children of all ages, as it causes great dryness and stiffness of that cavity, and of the tongue and throat, and in very young infants, who instinctively respire almost exclusively through the nostrils, it is attended with such violent efforts, as to be a chief or perhaps sole cause of the fatal termination of some cases. In one instance that we saw, the child was seized with attacks of suffocative breathing, which threatened fatal asphyxia, whenever the passages became much impeded. Under these circumstances the cleansing of the passages with a brush would afford complete relief, and, for a time, the little thing would appear to be quite well. Finally, however, death occurred in one of the attacks of dyspnœa, from sudden serous effusion into the lungs. The difficulty of respiration is greater, as we have stated, in proportion as the child is younger, and depends on the physiological fact already referred to, that at a very early age, respiration is performed almost solely through the nostrils, and that the child seems incapable of keeping the mouth open, in order to compensate for their closure. We have never observed *cough* except in cases accompanied by angina. *Epistaxis* occurred in two cases of the pseudo-membranous form, in children between three and five years of age. The bleeding recurred on several occasions, but ceased so soon as the coryza was cured. Infants refuse the breast when the passages are much clogged, or suckle with great difficulty and at long intervals.

The character of the *general symptoms* depends much more upon the accompanying disease, in older children, than on the coryza itself, and it is unnecessary therefore to dwell upon them. In the two infants observed by ourselves, the principal symptoms were, in the case unaccompanied by angina, restlessness, weakness, emaciation, dry, harsh, and wrinkled skin, and violent attacks of dyspnœa; and in the other case, in which angina was present, there were added to these, fever and somnolence. The *duration*, as observed by ourselves, in the two cases occurring in infants, was between two and three weeks, in the one unattended by other disease, and six days in the one accompanied by angina. In the other four cases, which occurred in older children, the duration of the attack depended on the form and degree of the attendant angina. In one case it became chronic, and was accompanied by ulceration of the nasal passages. MM. Rilliet and Barthez state that they saw a child two years old die in three days, and another of three years in the same time; but as one of these cases was complicated with angina and croup, and the other with pseudo-membranous angina, it is clear that the rapid death depended rather on the accompanying disease, than the coryza itself.

The *prognosis* must depend on the age of the child, and the form of the attack. Simple coryza is never dangerous except in very young infants, and rarely in them. When, however, it occurs in a delicate infant, and is accompanied with either sufficient turgescence of the nasal mucous membrane, or with enough viscid secretion, to cause a nearly complete occlusion of the nasal passages, the effort to breathe through the nose, and the diminished quantity of air that reaches the lungs, will sometimes give rise to great and dangerous exhaustion, or to partial or fatal asphyxia. In older children this form of the disease is never scarcely more than an annoyance.

When simple coryza occurs in connection with other diseases, whether thoracic inflammations, angina, or measles, it always adds, and sometimes most seriously, to the difficulties of the patient, since the effort to breathe through the obstructed air-passages must assist to exhaust the life-forces, while at the same time a certain amount of the blood in the lungs, which ought to be exposed at each inhalation to the inspired air, is deprived of this necessary contact by the fact, that less than the natural quantity of air is drawn through the nasal passages at each expansion of the chest.

The purulent and pseudo-membranous forms of coryza are always dangerous, whether they occur alone, or as a part of other diseases. The two cases of idiopathic membranous coryza in infants that came under our observation, both proved fatal. The four cases in older children recovered without any difficulty. When they occur in connection with pseudo-membranous angina, or in the course of scarlet fever, the prognosis will of course depend very much on that of those diseases.

Chronic Coryza.—Under this title we shall describe as succinctly as possible a form of inflammation of the Schneiderian membrane, of which we see a good many examples. It is characterized rather by swelling and thickening of the mucous membrane as far as this can be seen, and by an accumulation of scabs and crusts, causing obstruction to the passage of the air, than by a discharge. The secretions are, in fact, not much increased in quantity beyond their natural amount, but they consist of very thick mucus, or they are purulent in character.

We have met with this form of disease generally in children over two years of age, and from that period up to puberty. Its principal *cause* has always seemed to be some faulty state of the general health, some constitutional dyscrasia. Like the keratitis and chronic otorrhœa of children, it makes its appearance without any evident exciting cause whatever, or it follows an acute attack of catarrhal inflammation from cold, or an attack of measles, scarlatina, or epidemic angina. On one occasion, we met with it in three out of a family of four children. Though it is unquestionably very apt to occur in scrofulous children, its presence is not necessarily a sign that the patient is of scrofulous habit, since we have seen it in families in which there was no taint of that disease, and have known a good many of those affected by it to recover perfectly, and show no subsequent symptoms of the scrofulous or tubercular cachexia. Its chief efficient cause appears to be a low state of the general health, the blood being more or less markedly anemical, and the nutrition of the body imperfect. In addition to the above conditions, it must also be borne in mind, as a fact of the utmost importance, that this form of coryza occurs frequently as a symptom of constitutional syphilis.

The chief *symptoms* of this form of disease are of a local character. The breathing is at all times more or less nasal and embarrassed. Even in the waking state, the child will sometimes attract attention by the noisy and slightly oppressed character of its respiration, while when asleep the obstruction to the passage of air through the nasal passages will be so great as to give rise to symptoms which, though not alarming, are most annoying to those around. The obstruction to the passage of air through the nasal passages produces snoring or hissing sounds, which are sometimes so noisy as seriously to disturb those sleeping in the same apartment. This obstruction also obliges the child to make much greater muscular efforts than in the healthy state, to supply the thorax fully with air, so that the sleep, instead of being quiet and easy as in health, is broken and disturbed by the unusual play of the muscles, and by the disordered internal sensations caused by the reaction upon the nervous centres of a circulating fluid less thoroughly decarbonized than it should be. The child tosses and rolls, sighs and moans, or it cries out in its sleep, or it wakes suddenly and frequently.

When the nasal passages are examined by a full light, they will be seen to be obstructed in two ways: by a thickened and injected state of the mucous membrane, and by the presence in them of scabs, or of more or less inspissated masses of mucus or muco-pus. The mucous membrane is also redder and more highly vascular than natural, and sometimes exhibits an appearance in some points as though excoriated or slightly eroded. There is seldom, indeed rarely, any considerable amount of fluid secretion, as in acute coryza; the secretions are so much more viscid than usual that they desiccate in the passages and form scabs and crusts. Not unfrequently the surfaces become so irritable as to bleed very easily. The act of blowing the nose, a rude touch, or a blow, will cause a considerable discharge of blood, and this is often the symptom for which the practitioner is particularly consulted. The voice of the child is usually characteristic; it is nasal; and when the obstruction is considerable this becomes a marked symptom.

The general appearance of the patient almost always shows a deteriorated state of the general health. His color is too pale; the skin is muddy; the expression is languid; the tissues are more flabby and flaccid than they ought to be; and the movements are less brisk and prompt than in full health. Such patients wake from their sleep less refreshed than is natural; their appetite is often capricious and poor; and the digestive and nutritive functions are impaired. The tongue is often flabby in its texture, pale, and more or less furred, the bowels are irregular, and the discharges often scanty, and of an unhealthy color and smell, or there are alternations of diarrhœa and constipation.

The *duration* of this form of coryza is very indefinite. Under the most patient treatment, it often lasts for many months, and even when cured is very apt to return with or without apparent exciting causes, so that we have known it to last for several years.

TREATMENT.—Simple coryza requires no treatment in children over two years of age, except attention to hygienic conditions. Young children may often be preserved from attacks of spasmodic laryngitis and bronchitis, by calling the attention of the mother to the strong tendency which exists during infancy and childhood to the extension of disease, and advising, in cases of coryza, that the child should be secluded in the house, or else very warmly clothed if sent out.

In young infants, even the mildest coryza gives trouble, by obstructing the full freedom of the respiratory act, by interfering with the suckling, and by the restless and broken sleep which it induces. In such cases, all the treatment required is to keep the child warm, and to clear the nasal passages, and at the same time lubricate them, by the occasional introduction of a camel's hair pencil charged with glycerine, or sweet oil.

When the coryza is more severe, so as to interfere a good deal with the respiration, it is necessary to make use of the brush frequently, to administer a warm foot-bath once or twice a day, and to give a few drops of syrup of ipecacuanha, with sweet spirits of nitre, every two, three, or four hours. In such cases, the late Dr. Charles D. Meigs was in the habit, for many years past, of directing a flannel cap to be put upon the child, and kept there for two or three days;—a simple, and often most effectual mode of treatment. The cap should be removed after two or three days, so soon as the coryza is relieved, as otherwise the child is apt to become so much accustomed to it, as to take fresh cold when it is removed.

In infants laboring under purulent or pseudo-membranous coryza, the indications of treatment are to remove the secretions as they collect, and to subdue the inflammation of the mucous membrane by which they are produced. The first indication may be fulfilled by means of a brush made of long camel's hair, by throwing water from a small syringe into the nasal passages, or, when the discharges are thin and fluid, by blowing strongly into the nostrils, whilst the tongue is depressed by a finger introduced into the mouth, so as to allow the secretions to pass out of the posterior nares into the fauces.

The second indication is to be fulfilled chiefly by the application of solutions of alum, nitrate of silver, sulphate of zinc or copper, and by insufflations of different substances in powder. The best application is probably the solution of nitrate of silver, which may be made of the strength of five or ten grains to the ounce, or stronger, to be made use of several times a day, with a brush. We have also employed injections consisting of solutions of alum, of from three to six grains to the ounce. It is recommended by MM. Rilliet and Barthez to make insufflations of powdered gum and alum, or of gum and calomel in equal parts, several times a day. There is, however, it seems to us, an objection to this method of treatment, especially in infants,—which is, that the powders would necessarily tend to increase the obstruction which already exists, to breathing through the nose. It has been proposed also to apply a few leeches to the mastoid process, or over the frontal sinuses; but it seems to us that this could scarcely ever be advisable.

In the form of the disease accompanied with angina, an essential part of the treatment must be that of the throat-affection. This will be considered in another place.

The treatment of chronic coryza must be twofold: *general* and *local*. The most important points to be attended to in connection with the general treatment are the clothing, the diet, and the administration of tonics and alteratives. The *clothing* ought to be warm during the cold seasons of the year. Flannel, as a general rule, ought to be insisted upon. The arms and neck must be covered, and the legs should never be exposed, after the very mistaken fashion amongst many persons of the present day. The diet ought to be strengthening and nutritious. Fresh meats, milk, bread, and good butter, and the plainer vegetables, ought to be urged upon the child. If necessary, some authority must be made use of by the parents to induce the patient to take a sufficient quantity of these plain, but nutritious articles of food. Pastry, cakes, candies, nuts, hot bread, sweetmeats, and all such rich, but not really substantial diet, should be forbidden to as great an extent as possible.

Of the tonics to be given, the best are the preparations of iron and cod-liver oil. Of the former, we prefer commonly the syrup of the iodide of iron, from three to five drops, at four or five years of age, three times a day, in half a teaspoonful or a teaspoonful of sarsaparilla syrup. Or the Pulv. Ferri of the Pharmacopœia may be given, either in the form of powder, mixed with dry sugar, in pill, or in the shape of the chocolate lozenge. From half a grain to a grain, three times a day, is the proper dose from three or four years to six or seven. The carbonate of iron may be given, if it is preferred, for any cause. Either of these preparations of iron, or any other that may be chosen, should be combined with a grain of quinine three times a day, whenever the appetite is poor, and when the digestive process seems to be slow and feeble. Or the child may be made to take half a teaspoonful of the fluid extract of cinchona, mixed with an equal quantity of syrup of ginger, half an hour before the meals, while the iron is given alone soon after the meals. When the attack is particularly obstinate, and when, also, it occurs in a subject who either inherits or exhibits signs of the tubercular or scrofulous diathesis, or of the existence of constitutional syphilis, the best remedy is cod-liver oil, which should be given in doses of from half a teaspoonful to a teaspoonful two hours after each meal.

The *local treatment* must consist in the use of means intended to keep the passages clean and free from scabs and incrustations, and in the employment of astringent and alterative applications. When the patient will submit, the nasal passages should be cleansed by means of a syringe once or twice a day, with tepid water, or milk and water, or with a weak solution of alum in water. The latter may be made in the proportion of from two to four grains to the ounce. If the discharges are offensive, the lotion used for injection should consist of the solution of chlorinated soda, one, two, or three drachms in two ounces of water. After the use of the syringe, and more or less frequently through the day, according to the disposition to dryness of the surfaces, these should be lubricated with some oleaginous application. One of the best is glycerine, or glycerine rubbed up with cold cream (fʒi of the former to ℥i of the latter); or sweet oil, or oil of sweet almonds, may be used. These applications are best made by means of a camel's-hair brush.

Amongst the astringent applications, the best are weak solutions (gr. v to x to water f℥i) of the nitrate of silver, which should be used only once a day, or solutions of the sulphate or acetate of zinc with wine of opium. From two to five grains of either preparation, with a drachm of wine of opium, to an ounce of water, make a proper application. This may be applied twice a day. One of the best means that we know of, however, after the use of the alum or soda injection through the day, is to apply the following ointment at night: ℞. Ungt. Hydrarg. Nitrat., ʒss; Ext. Belladonnæ, gr. x; Axungiæ, ℥ss.—M. This has succeeded admirably well in several cases in which we have used it. It should be applied, after being completely softened by a gentle heat, on a camel's-hair pencil, care being taken to apply it thoroughly to the surface of the mucous membrane itself, and not merely to the outside of the hardened scabs.

CASE.—The subject of this case, a male, was born after an easy, natural labor, and appeared strong and well, with the exception of a little discharge of blood from the nose soon after birth and slight coryza, the latter of which continued until the child was five weeks old, when it became aggravated, and the late Dr. Charles D. Meigs was requested to visit the infant. One of us saw it at the same time. It was small and puny; the skin was harsh, dry, and wrinkled, so that the child looked like a little old woman. It was very weak, and had constant secretions from the nostrils of thick, dark-colored pus. When the discharge collected in sufficient quantity to obstruct the passages, the respiration became exceedingly difficult, as the infant seemed incapable of breathing through the mouth. At such moments it seemed as though the child must die of asphyxia. If the nostrils were cleared by any means, by syringing, by the use of a brush, or by blowing into them in the manner already described, the respiration would become easy and natural, until the discharge collected again, when the same scene recurred. During the paroxysms arising from the closure of the nasal passages, the child was entirely unable to take the breast, but after being relieved, had no difficulty whatever; the mouth was either kept shut, or if open, the tongue was observed to be pressed spasmodically against the roof of the mouth, so that it was impossible for more than a very small amount of air to pass over it; the respiration was labored, and accompanied by a loud snoring or nasal sound. There was no other marked symptom, except a nearly constant flatulent distension of the epigastric region. On the day before death, the infant seemed better, appeared to have gained flesh, and looked more intelligent, so that the mother was greatly encouraged; but the next day it was seized during one of the paroxysms of suffocation, which did not seem to be worse than many preceding ones, with copious discharges of bloody and frothy serum from the mouth and nose, and died in about three-quarters of an hour.

At the post-mortem examination we were not allowed to examine the nasal passages or throat. The stomach and bowels were healthy, but much distended with gas. The peritoneum was healthy, but contained a considerable amount of clear yellowish serum. There was serous effusion in both pleural cavities, but no traces of inflammation. The lungs were healthy, with the exception of some ecchymosed points, and general infiltration with sanguineous frothy serum. The trachea and bronchia were natural. The heart was larger than usual, but healthy in other respects.

## SECTION II.

## DISEASES OF THE LARYNX.

### GENERAL REMARKS.

THERE has been much confusion amongst writers on the diseases of children, until within a few years past, in regard to the diseases of the larynx, each one differing from the other in his opinions as to the nature of the several disorders of that organ, and of course as to their classification and symptoms. From later and more rigid observation it has become clear, however, it appears to us, that there are but three diseases of the larynx which deserve to be considered as separate and distinct affections; these are simple erythematous or catarrhal inflammation of the larynx, unattended with spasm of the glottis, or, as that symptom has been emphatically named, laryngismus; simple catarrhal inflammation of the larynx, attended with laryngismus, and called most properly spasmodic simple laryngitis, or more commonly simple, false, spasmodic, or catarrhal croup; and lastly, pseudo-membranous inflammation of the larynx, properly named pseudo-membranous laryngitis, and more commonly called true or membranous croup. There is, moreover, another disease, of which one of the most marked symptoms is spasm of the glottis, or laryngismus, attended with a hoop or stridor, which is now known by the name of laryngismus stridulus, but which is called also Kopp's or thymic asthma, spasm of the glottis, and croup-like convulsion. This disease has often been confounded with the above-named spasmodic affections of the larynx under the common title of croup, or has been supposed to constitute a distinct disease of the larynx; whereas now it is well known that the laryngismus whence its name was taken, is but one of many symptoms that mark the dependence of the disease upon disordered action of the reflex portion of the general nervous system.

We are well aware, also, that some most competent observers describe a purely spasmodic affection of the larynx, under the title of spasmodic croup, which they believe to be entirely independent of laryngeal inflammation, and to consist in a mere momentary contraction of the sphincter muscle of the larynx, produced by the sympathies which that part holds with other parts of the body, and especially with the digestive apparatus. As we have never, however, in what has now become a very considerable experience in the diseases of children, met with a case of spasmodic croup unconnected with more or less evident catarrhal inflammation of the larynx, we are not disposed to risk increasing the confusion already attending this subject, by making additional and more minute varieties of these affections than those above-named. We are quite willing to acknowledge that, in some cases of simple spasmodic croup, the amount of catarrhal inflammation of the larynx is slight, and that the symptoms of digestive disorder are very strongly marked, but in not a single instance of croup that has come under our notice, have we ever had reason to suppose that the croupal symptoms were dependent solely on simple spasm of the glottis (caused by some distant irritation), unattended with inflammation of the laryngeal mucous membrane. In all such cases that we have met with, it has seemed to us that the condition of gastric, intestinal, or bilious disorders, might be explained in one of two ways. Either the disorder of the digestive function has rendered the child unusually susceptible to cold, by having diminished its power of resistance to the weather; or, the derangement of the bodily functions caused by the cold has weakened, amongst others, the digestive system, and thus brought about various symptoms of gastric or intestinal disturbance, or more commonly of indigestion.

## ARTICLE I.

### SIMPLE LARYNGITIS WITHOUT SPASM.

**Definition; Frequency.**—This disease consists of simple erythematous or catarrhal inflammation of the mucous membrane of the larynx, unattended with spasmodic closure of the organ. It is sometimes attended with ulceration, but is unaccompanied by exudation of false membrane. The frequency of the disease, during infancy and childhood, is very considerable, so much so, that not a winter passes without our meeting with a good many well-marked cases.

**Predisposing Causes.**—The disease occurs at all periods of childhood, but seems to be more frequent under than over five years of age. Of sixty-two well-marked primary cases that we have met with in which the age was noted, fifty occurred in children under, and only twelve in those over that age. Of the former class, twelve were under one year, seventeen between one and two, nine between two and three, five between three and four, and five between four and five. Of sixty-four cases in which the sex was noted, thirty-six occurred in boys, and twenty-eight in girls. As to the influence of the seasons, it may be stated that it is by far the most common in the fall, winter, and spring months.

The only *exciting* causes of the disease which appear to have been ascertained with any certainty, are the action of cold, the positive influence of which cannot be questioned; the inspiration of irritating substances, such as gases, smoke, powders floating in the air, &c.; and violent efforts of crying. MM. Rilliet and Barthez state that they have twice known erythematous and ulcerative laryngitis to follow long-continued and violent crying; and M. Billard also cites this as a cause. We are acquainted with one case in which a slight attack of the disease appeared to have been brought on solely by loud and obstinate screaming.

The disease is very apt to occur in the course of other maladies, and particularly of measles, small-pox, scarlet fever, bronchitis, and pneumonia.

**Anatomical Lesions.**—The anatomical alterations may consist of simple inflammation of the mucous membrane, with its various effects, or of the same changes in connection with ulceration. The latter class of lesions is almost always confined to secondary cases. In the former class, the mucous membrane varies in color between a deep rose and violet-red, which may be either uniform or only in patches. In severer cases, the tissue is at the same time softened or roughened, and sometimes thickened. When redness, softening, and thickening are present, the disease is generally confined to certain parts, and commonly to the epiglottis and internal portions of the vocal cords; but when redness alone exists, it usually affects the whole of the larynx, and sometimes extends to the trachea. In cases attended with ulcerations, these alterations exist in connection with those already described. The ulcerations are generally small, few in number, very superficial, linear in shape, and are almost always found upon the vocal cords. They are so slight often as to escape observation, unless a very careful examination be made; and this, perhaps, explains the circumstance of so few persons having met with them in the simple acute disease.

SYMPTOMS; COURSE; DURATION.—The attack generally begins with an alteration of the *voice or cry*. In infants the change in the cry alone exists, so that to detect the disease, it is necessary to hear the child cry. In older children the same alteration of the cry is present, but there is in addition a change of the voice, consisting of various degrees of hoarseness. These symptoms may be so slight as to be observed in the cry only when it is strong and forcible, and in the voice so as to strike only the ear of one accustomed to be with the child; or they may be so marked as to be heard in the faintest cry that is uttered, and to be evident in the voice in a moment to the most careless observer; or there may be complete aphonia. They are often intermittent in this form, and are generally most marked in the after part of the day and during the night. Simultaneously with this symptom, or very soon after, *cough* occurs. This is generally hoarse and rough, and early in the attack, dry; at a later period it usually becomes loose, and as this change occurs loses its character of hoarseness. The frequency of the cough is variable, but usually moderate; as a general rule it is most frequent in the evening, and early in the morning, particularly in infants and young children. The disease is almost always preceded and attended with some coryza, which, in the early stage, is marked by sneezing and slight incrustations about the nostrils, and at a later period, by mucous and sero-mucous discharges. The *respiration* remains natural, except that it is sometimes nasal, and sometimes a little accelerated. There is rarely any fever, or it is slight, and occurs only at night. There is no pain in the larynx. In some cases, the hoarseness of the cry, voice, or cough scarcely exists, or is but slightly marked, and the only symptom is a dry, hard, teasing, and paroxysmal cough, which, from its sound, evidently proceeds from the larynx, and resembles very much that produced by the tickling of a foreign body in the throat.

The symptoms of this disease, instead of being of the mild character just described, may be much more severe. The cough is more frequent, hoarse, troublesome, and painful, from the scraping and tearing sensations it occasions in the larynx. The voice is more affected, becoming from husky more and more hoarse, though it is very unusual for it to become weak and whispering, as in membranous and severe spasmodic croup. The respiration is decidedly accelerated, giving rise to slight dyspnœa, and there is more or less fever, which is most marked usually in the after part of the day and in the night. The pulse is more frequent than in health, rising to 120 or 130 in the minute; the skin is hot and dry; the child is thirsty, restless, and uncomfortable. After a few days usually, the cough becomes loose and easy, and ceases to be painful; the voice loses its hoarse tone gradually, the fever disappears, the appetite and gayety return, and the child regains its usual health.

When the laryngeal inflammation becomes violent in this disorder, so as to be attended with considerable swelling of the mucous membrane, the case always, according to our experience, assumes the shape of grave spasmodic laryngitis. To our article upon this latter affection, spasmodic croup, we must refer the reader for further information on this point.

In nearly all the cases of this form of laryngitis that have come under our observation, we have found, upon examining the fauces, more or less decided inflammation of the tonsils, soft palate, and pharynx. In cases following a rather chronic course, from two to four or six weeks, which are rarely accompanied by fever or hoarseness, except at the invasion, and sometimes in the evening, the pharyngeal mucous membrane presented a roughened, thickened appearance, and the tonsils and uvula were more or less enlarged and tumefied.

There is a form of obstinate, troublesome cough, to which children are subject, and of which we have met with a good many examples, that must be noticed here. It depends evidently upon chronic inflammation, with thickening of the mucous membrane lining the upper portion of the larynx. Of this we feel assured, not from any post-mortem examination, since we have never known a child to die of, or while laboring under the affection, but from the tone and character of the cough, from its occasional association with hoarseness of the voice, from its being almost invariably coincident with thickening and granulation of the pharyngeal mucous membrane, and from the fact that the most careful physical examination of the chest fails to reveal any disease whatever of the lungs. The cough is harsh, rough, and, so to speak, tearing in its character. It often sounds, especially towards evening and in the early part of the night, croupal in its tone. It is usually very frequent, not so much, however, during the day, as in the evening and night. It is very generally increased by the horizontal position, so that when the child is put to bed, he will begin to cough violently and almost incessantly, and will continue to do so for one, two, and even three or four hours. The cough is so constant and so severe as to cause the greatest disturbance not only to the patient, who will toss and turn in bed in the most restless manner, but to the mother or attendants, who are excessively annoyed, and sometimes alarmed, by its constancy and obstinacy. Children who become subject to this species of cough, often have repeated attacks during the cold seasons of the year, the slightest exposure sometimes bringing them on. Each attack may last from a few days to several weeks. In one case we knew it to last, without once entirely ceasing, three months, and in another it lasted, with imperfect suspensions of a few days, during the same length of time. Both these cases occurred in hearty boys, one in the second, and the other in the third year of life, and yet both were vigorous and healthy children, as time has shown. In many other instances, we have known it last two, three, and four weeks, proving all that time most troublesome and rebellious to treatment. During the day, the child generally seems perfectly well, or at most merely a little pale and languid, and he coughs but moderately, but as soon as night comes on, and especially when he is put to bed, the cough begins, and goes on for hours, as stated above, unless some remedy, and particularly some opiate, be given to check it. It is most annoying to the practitioner, for he finds that his usual remedies act merely as palliatives. They check and modify, perhaps overcome it for a time, but the next change in the weather, and especially the least exposure to cold and damp, start it afresh, and he has to resort again to the same round of treatment to subdue it. To the members of the family also it gives great anxiety. At first, they fear it must run into croup, which, however, it very seldom does, and then, finding how difficult it is of cure, and how often it recurs, they can scarcely be persuaded that it does not depend on some serious disease of the lungs.

The principal *cause* of this form of chronic laryngeal irritation is, so far as we have been able to ascertain, an unusual susceptibility of the laryngeal mucous membrane, sometimes the result of a congenital idiosyncrasy, and at other times the result of influences coming into action after birth, and especially of improper dress. We have generally met with it in children dressed upon the hardening system so much in vogue with many of our most highly educated citizens. The low frock, leaving the neck and upper half of the chest exposed to the air, the bare arms and bare legs, persevered in through our cold autumns, winters, and springs, have certainly, in most of our cases, been the cause of this troublesome and chronic cough.

Our experience since the publication of the last edition fully confirms the truth of these remarks upon the style of clothing just referred to. We certainly do not see so many cases of obstinate laryngeal cough as we formerly did, for the simple reason that but few of the families we take care of, adhere to the old-fashioned system of leaving their children half naked.

The *duration* of the disease varies according to its form and the circumstances under which it occurs. When primary, it lasts usually from a few days to one or two weeks, but when it becomes chronic, as we have known to happen in a good many instances, it has lasted from two to four or six weeks, and even two and three months. The duration of secondary cases depends, of course, upon that of the disease during which they occur.

DIAGNOSIS.—The diagnosis of simple laryngitis is very easy. The hoarseness of the cry, voice, and cough, the redness of the mucous membrane of the pharynx, and the absence of general symptoms, will distinguish it from any other affection. In somewhat severer cases of this form in which the cough is more frequent and harassing, the general symptoms more strongly marked, and the respiration somewhat hurried and oppressed, the attack may at first view present the appearances of bronchitis or pneumonia. The absence of the physical signs of these affections will show at once, by negative evidence, the true nature of the case.

In some cases in which there is little or no hoarseness of the voice or cough, the symptoms strongly resemble the early stage of hooping cough. We have met with five instances in which it was difficult not to believe, for two and three weeks, that the attack was really one of this disease. In one of these the resemblance was so close, that for several days there was a distinct hoop during the fit of coughing, with vomiting at the close of the paroxysm. The grounds for deciding that the case alluded to was not one of pertussis, were, that the attacks came on like laryngitis, after measles, and that the paroxysms occurred only at night. In the other cases a correct diagnosis was arrived at only by attention to the state of the fauces, which are almost always more or less inflamed and thickened in laryngitis, whilst they are not so in pertussis, and by watching the progress of the sickness.

PROGNOSIS.—The prognosis is always favorable in the mild form of the disease. We have never met with a fatal case.

TREATMENT.—The treatment of the milder cases of this form of laryngitis ought to be very simple. Children under four or five years old ought to be confined for the first few days to the house, unless the weather be dry and not intensely cold. In mild weather they may be sent out for a short time in the middle of the day. When the patient is five or over, he may continue to go out through the day, unless the weather be very bad. Much must depend upon the peculiarities of the child's own constitution. These can only be learned by observation on the part of the mother. Some children bear going out with such attacks perfectly well; others, if sent out with this simple laryngitis, are almost certain to have spasmodic croup or bronchitis more or less severely. When there is any febrile movement in the case, no matter how slight, the child ought to be kept quiet, and confined to the house. Attention to this point, therefore, careful management of the clothing, slight reduction of the diet if there be any fever, a foot-bath at night of simple water, or of water containing a little mustard, the application of some slightly stimulating liniment to the front of the neck and throat twice a day, and the occasional internal administration of some gentle expectorant and anodyne dose, constitute all that is necessary in the great majority of cases of this kind. The best internal remedies are a few drops of syrup of ipecacuanha, with paregoric, laudanum, or solution of morphia, given every evening as the child is put to bed, or occasionally through the day also, if the cough is troublesome. A combination of syrup of seneka with that of ipecacuanha, will often be found very serviceable.

The treatment of the chronic laryngeal cough, unattended by fever or any severe constitutional symptoms, described above, requires some special remarks. In the first place, we have to state that we have seldom succeeded in curing it until we had obtained from the parents their consent (often obtained with great difficulty) to a proper dress for the child. Expectorants, nauseants, opiates, antispasmodics, counter-irritants, and local applications, have nearly always failed to procure more than temporary alleviation, until the child has been dressed warmly. We have cured, on several occasions, this kind of cough, after many ineffectual trials with the above remedies, only by insisting upon a mode of dress which covers the neck, arms, and lower extremities. A merino or soft flannel shirt, with long sleeves and high neck, long merino stockings, and thick muslin or canton-flannel drawers, have done more in such cases to effect a cure than all other means. This style of dress has removed the cause, the constant chilling of the body, and then the usual therapeutic measures will, no doubt, assist in overcoming the local changes which constitute the disease.

The best therapeutic measures to be adopted in such cases are the application, once a day, of a solution of nitrate of silver, of from five to twenty grains to the ounce, low down into the pharynx and chink of the glottis, by means of a small sponge-mop on a bent whalebone. After several applications have been made daily, they should be made only once in two or three days. The strength of the solution is to be determined by the condition of the pharyngeal mucous membrane, as we may assume this to mark, in some measure, the state of the contiguous tissue of the glottis. When the mucous membrane of the fauces is covered with large, protuberant follicles, when the tissue between the follicles is thickened, relaxed, spongy-looking, and when the color of the membrane is dark red, the stronger solutions are the best; when, on the contrary, the mucous membrane is not roughened nor thickened materially, when the follicles are small, when the color of the tissues is bright red, it is best to use only the five-grain, or even a weaker, solution. The most useful internal treatment in our hands has been the exhibition, three times a day, of one of the following mixtures, preferring that with antimony for a vigorous child, and that without antimony for one less robust.

| | |
|---|---|
| ℞.—Potass. Carbonat., | ℈i. |
| Vin. Antimon., | fʒss vel i. |
| Tinct. Opii, | gtt. xxiv, vel xlviii. |
| Syrup. Simp., | f℥i. |
| Aq. Cinnamom., | f℥ii.—M. |
| Ft. Mistura. | |

| | |
|---|---|
| ℞.—Potass. Carbonat., | ℈i. |
| Tinct. Opii, | gtt. xxiv, vel xlviii. |
| Syrup. Senegæ, | fʒii. |
| Syrup. Tolutani, | fʒvi. |
| Aq. Fluvial,. | f℥ii.—M. |
| Ft. Mistura. | |

One of the most troublesome cases of cough we ever met with, occurred two years since in a fine, intelligent, but not robust boy, four years old.

He was seized with a hard, obstinate cough, which, in a few days, became really terrible from its almost incessant repetition for many hours at a time. The cough was dry, tickling, choking, repeated with nearly every breath, and so incessant as to drive the parents—and we may add the doctor—almost frantic. The little fellow at last found out, instinctively, that, by placing himself on the front of the body on two pillows, with the chin hanging over the edge of the upper one, he coughed less frequently, and with less violence, than in any other position. Discovering that the uvula was very much lengthened from relaxation and elongation of its mucous membrane, we touched the lower sharp extremity with the lunar caustic stick twice a day. At the same time the following mixture, which we had often used to control general nervous irritability in children, was prescribed; and this, with the lunar caustic application, finally controlled the cough. It was as follows:

℞.—Vin. Antimonii, . . . . . . . . . . gtt. xlviij.
Ext. Valerianæ Fl.,
Tr. Opii Camph., āā . . . . . . . . fʒij.
Syrup. Simp., . . . . . . . . . . f℥ss.
Aquæ, . . . . . . . . . . . . f℥j.—M.
S. A teaspoonful every hour or two when the fits of coughing set in.

After a few days, when the irritability of the fauces was somewhat subdued, the elongated portion of the mucous membrane of the uvula was cut off close to the muscle, and there was no renewal of the cough afterwards.

When the cough is very harassing at night, from two to four drops of laudanum, with from ten to twenty drops of syrup of ipecacuanha, or two grains of Dover's powder, given once or twice in the evening, have answered better than any other means. When the patient presents an anemical appearance, or other symptoms marking a general deterioration of the health, iron, and especially the syrup of the iodide of iron, given three times a day, has assisted in removing the cough, and especially in lessening the extreme susceptibility of the system to changes of the weather. The diet ought to be light, but strengthening. Good fresh meat, with simple nutritious vegetables for dinner, and bread and milk morning and evening, constitute the most proper diet. In bad weather, during the cold seasons of the year, the child should be confined to the house.

## ARTICLE II.

### SPASMODIC SIMPLE LARYNGITIS, OR SPASMODIC OR FALSE CROUP.

**Definition; Synonymes; Frequency; Forms.**—Spasmodic laryngitis is a disease of the larynx almost peculiar to children, consisting of simple catarrhal inflammation, without pseudo-membranous exudation, of the mucous membrane of that organ, attended with spasmodic contraction of the glottis, or laryngismus, occasioning violent attacks of threatened suffocation.

It is the disease commonly called in this country croup, or, by those who make the distinction between it and pseudo-membranous laryngitis or true croup, spasmodic croup. It is known also by the names of false or pseudo-croup. We prefer the term spasmodic laryngitis, because it is expressive of the essential characters of the disease. It is the stridulous laryngitis of MM. Guersent and Valleix; the stridulous angina of M. Bretonneau; the acute asthma of infancy of Millar; and the spasmodic croup of Wichmann, Michaelis, and Double. It is not the laryngismus stridulus described by the English authors, Kerr, Ley, and Marsh, which is the same as the thymic or Kopp's asthma of the Germans, and spasm of the glottis of the French. It is called by Dr. Wood, in his work on the practice of medicine, catarrhal croup.

Spasmodic laryngitis is one of the most *frequent* of the diseases which occur during childhood in this country. It is so common in this city, that almost all mothers who have had any experience in sickness, keep some remedy for it in their houses, which they are in the habit of resorting to upon their own judgment.

During the last 20 years we have had under our charge 109 cases of the disease, of which we have kept an accurate record, and at least 100 other cases, of which we have no written account. Of the 109 cases, 86 were of the mild, and 23 of the severe form.

We shall describe two *forms* or degrees of this disease, the *mild* and the *severe*. Without this distinction it would be impossible to give an accurate account of the disorder, since the two forms differ so much in aspect as to render them almost as much unlike as though they were two distinct affections. Moreover, the mild form differs so widely from membranous or true croup in its course and symptomatology, that the distinction between the two is readily made out, whilst the severe form, on the contrary, resembles true croup so much as to demand often very nice powers of observation to distinguish them, and yet the distinction is one of vast consequence to the patient, since the prognosis and treatment are widely different in the two diseases.

Predisposing Causes.—The disease is much more common at some *ages* than others. It occurs most frequently during the period of the first dentition, being more common in the second year of life, which is the time of greatest activity of the first dentition, than at any other age, though it is often met with also in the third and fourth years. In the fifth year it still occurs occasionally, in the sixth and seventh it becomes rare, and after the seventh we have seen it but a few times. Of 106 cases of the disease that we have attended, in which the age was noted, 8 occurred in the first year of life, 33 in the second, 22 in the third, 26 in the fourth, 12 in the fifth, 2 in the sixth, 2 in the seventh, and 1 in the eighth.

It is said to be more frequent in boys than girls, and this seems borne out by our own experience, since of 106 cases, 62 occurred in boys, and 44 in girls.

Spasmodic croup occurs usually as a *sporadic* disease, but is said by some authors to prevail at times as an *epidemic*. We have never had any reason to suppose that it was strictly an epidemic like membranous croup, which appears to a considerable extent in some years, and in others is scarcely seen. We believe rather that the unusual prevalence of spasmodic laryngitis at certain periods, in comparison with others, depends on the fact that certain states of the weather or season predispose or excite to it in a greater degree than usual, and thus occasion a large number of children to be attacked with it.

It is generally believed to be hereditary in certain families, and of this we ourselves have no doubt. We are acquainted with one family in this city, in which the children for three generations were extremely liable to it; with another, in which the grandmother and grandchildren were frequently attacked; and with a third, in which the father and children showed the same predisposition in the most marked manner. The idea is, moreover, entertained by many people in this community.

The natural constitution of the child does not seem to have much influence upon the liability to the disease; it occurs indifferently in the weak and strong. We have no doubt, however, that there are certain transient conditions of the health which do affect the liability to it, since it has long been remarked that disturbances of the digestive functions frequently invite it, and since we have often ourselves found it most apt to attack those who are liable to it, when they happen to be laboring under bilious disorders or indigestions. It is most common during cold weather.

Exciting Causes; Cold.—By far the most frequent exciting cause is the action of cold; either the passage from a warm into a cold atmosphere, or prolonged exposure to cold and damp. It has been known on several occasions to follow long-continued crying, doubtless from inflammatory action set up in the larynx, as a consequence of the excessive determination of blood to that part during the act of crying. We were assured, some time since, by a very intelligent woman, that her little daughter had, at the age of two years, a well-marked attack of croup, after a severe and long-continued fit of crying from some contrariety.

Anatomical Lesions.—Mild cases of spasmodic laryngitis are so rarely fatal, as to leave us in some doubt as to the character of the anatomical lesions, or whether there are indeed any perceptible alterations of the tissues. We have never ourselves met with a fatal case of this form, and are therefore unable to give any personal account of the condition of the larynx, though we have never doubted, from the nature of the symptoms, the hoarseness, the dry cough, which afterwards becomes loose, and the whole aspect of the disease, that the anatomical condition of the affected organ must be one of slight inflammatory hyperæmia. In some cases, however, that have been examined, a little mucus in the larynx, and slight redness have been found, while in others no change has been detected. Dr. Wood (*Treat. on the Prac. of Med.*, vol. i, p. 779) accounts for this absence of morbid appearances in the following plausible manner: "In some rare instances, no signs of disease are discovered in the mucous membrane, and the patient has probably died of spasm, consequent upon high vascular irritation or congestion, the marks of which disappear with life."

Cases of severe spasmodic croup have not unfrequently proved fatal, and the anatomical alterations of this form of the disease have therefore been well ascertained. These alterations consist of either simple catarrhal inflammation of the laryngeal mucous membrane, or of inflammation attended with ulceration. When the inflammation is simple, the membrane is changed in color, either uniformly or in spots, to a deep rose or dark red tint. This may be the only alteration, or the tissues may be found also softened, or roughened and thickened. When the redness, thickening, and softening, are all present, these appearances are usually confined to certain parts, and particularly to the epiglottis and vocal cords, but when redness alone is present, it generally affects the whole of the larynx, and may extend to the trachea. To the alterations just described are sometimes added, as was stated above, ulcerations. These are commonly small, few in number, of a linear shape, and are usually seated upon the vocal cords. They are so slight as to escape observation, unless carefully looked for.

SYMPTOMS; DURATION.—The invasion of the *mild form* of spasmodic croup is generally very sudden, for though it is often, probably in a large majority of cases, preceded for a few hours or a day or two by slight coryza, hoarseness, and cough, these symptoms are seldom noticed at the time, and the child is not supposed to be sick until seized with the paroxysm of suffocation, which is pathognomonic of the disease. This occurs in much the larger number of cases during the night, and very generally wakes the child from sleep. Of sixty-four cases observed by ourselves, in which the time of the attack was noted, it occurred in the night in sixty-two, whilst in two it came on in the afternoon. The period of the night at which it takes place is very irregular, but it is much more apt to be before than after midnight, as is shown by the fact, that of forty-two cases in which this circumstance was ascertained, the attack was before midnight in thirty, and after in twelve. This agrees very closely with the statement of MM. Rilliet and Barthez, that it has been observed most frequently at eleven in the evening. The duration of the paroxysms varies considerably, and depends a good deal upon the treatment employed. They may last from a few minutes to several hours, but are seldom shorter than from half an hour to an hour. The number of the attacks also varies. In some cases there is but one, though very generally there are several. When the attack occurs early in the night, it is very apt to recur again towards morning, and, unless means of prevention are used, on the following night also, and even, though this happens much more rarely, on the third night. As a general rule, the first attack is the most severe.

When the paroxysm comes on, the child is wakened from sleep by the sudden occurrence of symptoms apparently of the most alarming and dangerous character. These consist of loud, sonorous, and barking cough; of prolonged and labored inspiration, accompanied by a shrill and piercing sound, to which the term stridulous is applied; of rapid and irregular respiration, amounting often to violent dyspnœa, or seemingly impending suffocation: the child, alarmed and terrified at its condition, and at the fright of those around, its countenance expressive of the utmost anxiety, cries violently between the attacks of coughing, and begs to be taken on the lap, or sits up or tosses itself upon the bed, struggling apparently with the disease, which seems for the moment to threaten its very existence. The voice and cry are hoarse, and sometimes almost extinguished during the height of the paroxysms, but become distinctly audible, and often nearly natural, in the intervals between them; differing in this respect from pseudo-membranous croup, in which they remain permanently hoarse or whispering. We have never heard, in this disease, the whispering voice and the short smothered cough of true croup. The face, head, and neck, are at first deeply flushed, and as the paroxysm becomes more violent, assume a dark livid tint, which afterwards passes into a deadly paleness, if the attack be long continued. These changes in the coloration depend upon the arrest of the respiratory function and a consequent partial asphyxia. The pulse is frequent during the paroxysm, and the skin sometimes heated. After a longer or shorter period, generally from half an hour to an hour, the respiration becomes more tranquil; the stridulous sound disappears entirely, unless the child be disturbed and made to cry, when it again becomes distinct; the cough is less frequent and less boisterous, and the child generally falls asleep. The attack is very apt to recur towards morning, as has been stated, and if not then, the following night. The patient often seems perfectly well the day after the first paroxysm, with the exception, perhaps, of slight cough. This is no reason, however, for supposing that the disease will not return in the course of the second night, which is almost sure to happen, unless measures be taken to prevent it. The cough generally continues for a day or two, but soon loses the peculiar character expressed by the term croupal; it becomes less frequent and more loose, and the child is commonly well again in two or three days. Sometimes, however, the cough lasts for several days, becoming gradually less frequent, until at last it ceases entirely.

There is very little fever in mild cases, for though the pulse is accelerated and the skin warm during the paroxysm, these symptoms disappear very soon after that is over. In more severe cases, on the contrary, there may be considerable fever, the pulse becoming frequent and full, and the skin hot. The febrile movement is most apt to occur after the first paroxysm, as a consequence, apparently, of the slight catarrh which remains after the attack.

In the few fatal cases on record, the paroxysms have generally become more frequent and more violent by degrees, and death has occurred from suffocation. In other instances, death has been the result of prostration, which itself has probably depended on imperfect hematosis.

Recurrences of the disease are very common, children sometimes having several attacks in a single winter. This is not the case in true croup. We have known but two children to have a second attack of that disease.

The *severe form* of spasmodic laryngitis may begin as such or result from an aggravation of the mild form; or the case may commence as one of simple laryngitis without spasm of the glottis, and as the intensity and extent of the laryngeal inflammation increase, it may assume all the features of the form under consideration. Whatever be the mode of onset of the case, this form of the disease sets in with hoarse, frequent cough, difficult respiration, restlessness, and more or less violent fever, symptoms which almost always become severe for the first time at night, and usually between early evening and midnight; though, in some few cases, they make their first appearance during daylight, and this is very much more apt to happen in this than in the mild form of spasmodic croup. During the night the symptoms increase in severity; the respiration is frequent and difficult, and, after a time, attended with the stridulous sound in inspiration and expiration caused by narrowing of the glottis: the cough is hoarse, dry, and croupal, and unattended with expectoration; the voice becomes hoarse, and fever sets in, the pulse becoming full and frequent, the skin hot and dry, and the face flushed. These symptoms persist, with greater or less severity, throughout the night, while from time to time, they increase to such an extent as to seem to threaten suffocation, resembling then exactly the paroxysms described as occurring in the mild form of the disease. They usually subside, however, very decidedly towards morning, the breathing becoming easier, the stridulous sound less loud, or ceasing altogether, the fever diminishing, and the patient becoming in all respects much more comfortable. This amelioration of the child's condition often continues until the after part of the day or till evening, when the same train of symptoms reappears. In other cases the disease scarcely subsides at all for two, three, or four days, but continues throughout the day and night to exhibit the same symptoms as have been described above. In cases of this kind, which are not rare, the disease assumes many of the alarming and dangerous characters of pseudo-membranous laryngitis or true croup, and it becomes very difficult often to distinguish between the two. If no favorable change take place, the dyspnœa becomes so violent as to threaten suffocation; the cough is rare and short; the voice is reduced to a mere whisper; the pulse becomes small, extremely rapid and thready; the countenance, at first livid and congested, assumes a pale, cadaveric appearance; the features are contracted; the child becomes comatose or delirious, and death occurs from slow asphyxia, or sometimes in an attack of general convulsions.

In favorable cases, on the contrary, the dyspnœa, and especially the stridulous sound, diminish; the cough becomes loose, less hoarse, and loses its croupal character; expectoration of mucous sputa takes place in older children, whilst in younger, the loose gurgling sound produced by the discharge of the sputa into the fauces, is heard at the termination of each cough; the voice becomes clearer and stronger; the fever diminishes; the child regains its spirits and disposition to be amused; and soon all dangerous symptoms have disappeared, and the recovery is established.

In nearly all the cases that have come under our observation, we have found, upon examining the fauces, more or less decided inflammation of the tonsils, soft palate, and pharynx.

The *duration* of the *severe form* of spasmodic croup depends on the violence of the attack, and on the mode of treatment. When the treatment is begun with from an early period, the disease is much sooner overcome than when allowed to run on for some time without remedies. In cases of moderate severity, the violence of the symptoms usually subsides after thirty-six or forty-eight hours. In more violent cases, on the contrary, the symptoms seldom subside definitively before the third, fourth, and not unfrequently the fifth day. In no case that has come under our observation, has the disease continued to present dangerous symptoms after the fifth day, unless, as not unfrequently happens, the inflammation spreads to the bronchia or tissue of the lungs, producing bronchitis or pneumonia. But even after the signs of severe laryngeal inflammation have disappeared, there almost always remains for several days longer, some cough and huskiness of the voice, marking that the mucous membrane of the larynx has not yet regained completely its healthy condition. The disease is said to have proved fatal in twenty-four hours.

NATURE OF THE DISEASE.—Authors hold very different opinions as to the nature of spasmodic laryngitis. By Underwood, Dewees, and Eberle, it is confounded with membranous laryngitis, they making no distinction between false or catarrhal, and true or membranous croup. Dr. Cheyne (*Cyclop. Pract. Med.*, Art. Croup), treats of the two affections as one and the same disease, differing only in their degree of violence. Dr. Copland (*Dict. of Pract. Med.*, Art. Croup), describes spasmodic croup as a variety or modification of true or membranous croup. He supposes that the modifications of true croup are attributable to "the particular part of the air-passages chiefly affected, to the temperament and habit of body of the patient, and the intensity of the causes." It seems to us, however, that these views as to the nature of the two diseases are not correct, and we are induced by personal observation to regard them as distinct affections, which may, in the great majority of cases, be distinguished from each other at a very early stage, by a careful observer. The comparative fatality of the two diseases alone is sufficient to establish a wide difference between them. Thus, of 35 cases of the pseudo-membranous form that we have seen, 16 died; while of considerably more than 200 cases of the spasmodic form that we have seen, not one has been fatal. M. Guersent states that of ten cases of the former disease, scarcely two escape; while of upwards of a hundred of the latter that he has seen, not a single one was fatal. (*Dict. de Med.*, t. ix, p. 365.)

The different effects of treatment in the two affections also point to a wide difference in their nature. True croup is almost inevitably fatal, unless attacked at an early period by energetic remedies, while the mild spasmodic form seldom resists the exhibition of an emetic, a warm bath, or of nauseating doses of ipecacuanha or antimony, and the severe form, though of a most threatening appearance, almost always yields to the proper employment of very moderate local depletion, aided by the use of expectorants, emetics, opiates, and correct hygienic means. When we add to these circumstances, the differences in the anatomical alterations in the two diseases, the difference in the mode of invasion, in the cough, voice, cry, fever, duration of the attack, and state of the constitution, all of which will be carefully described in the remarks on diagnosis, we do not see how we can resist the conclusion that they are two distinct disorders, and not, as was formerly generally asserted by English writers, degrees or modifications of the same.

We believe, therefore, that mild spasmodic laryngitis is a disease consisting in slight catarrhal inflammation of the mucous membrane of the larynx, attended with violent spasmodic contraction of that organ, or, as that condition has been called of late, laryngismus. The spasm of the laryngeal sphincter seems to be the result of a disordered action of the excito-motory innervations of the part, the irritant, which is productive of the morbid innervation, being, in all probability, the inflammation of the laryngeal mucous membrane, which has been already stated to constitute one element of the malady. The nervous element predominates in the early part of the attack, but towards the conclusion, the spasmodic symptoms disappear entirely, and we have left only those which depend on the local tissue-changes.

In severe cases of the disease we have the same element of laryngeal spasm, or laryngismus, coincident with, and produced by, a much more intense and dangerous inflammation of the mucous membrane of the part than exists in the mild form.

DIAGNOSIS.—Unquestionably the disease with which spasmodic laryngitis is most likely to be confounded is pseudo-membranous laryngitis, or true croup. There is very little difficulty, however, in distinguishing the mild form of spasmodic croup from true croup, whilst in regard to the severe form, it may be safely stated, that the distinction cannot, in some cases, be made with positive certainty, except by watching the course of the sickness.

Mild cases of spasmodic croup may be distinguished from membranous croup by a comparison of the different symptoms as they arise. The most important of these are: the invasion, in one sudden and almost invariably in the evening or night, in the other, slow and creeping, the paroxysm first occurring indifferently day or night; the cough, in one hoarse and boisterous, in the other hoarse and frequent at first, but rare and smothered towards the end; the voice, in one hoarse, but never scarcely whispering, and if so, only during the height of the paroxysm, in the other hoarse at first, and soon permanently whispering or entirely lost; the cry, in one hoarse and stridulous only at the moment of the paroxysm, in the other permanently so; the respiration, in one stridulous and difficult only during the paroxysm, and in the interval perfectly natural, in the other, at first natural, becoming by degrees permanently stridulous, and attended by the most violent dyspnœa, with remarkable prolongation of the expiration and even with recession of the base of the thorax in inspiration; the fever, in one very slight and generally observed only during the nocturnal paroxysm, in the other much more considerable and permanent; and lastly, the duration, in one seldom more than two or three days, in the other rarely less than six, and very often eight or ten days. M. Trousseau states that the *hoarse-sounding croupal* cough, is not a sign of the presence of exudation in the larynx, but rather of its absence; but, "when the cough, croupal at first, becomes less and less frequent, and ends with being nearly insonorous with suffocation, there is true croup, that is to say, with plastic exudation in the larynx." This is precisely our own experience. The rare, insonorous cough of M. Trousseau, is the condition which we have expressed by the term smothered.

In order to render the diagnosis still clearer, we add the following table, which is altered from one given by MM. Rilliet and Barthez.

| MILD SPASMODIC LARYNGITIS. | PSEUDO-MEMBRANOUS LARYNGITIS. |
|---|---|
| Begins with coryza and hoarse cough, or more frequently with a sudden attack of suffocation in the night. Fauces natural, or merely slight redness, as in simple angina. | In epidemic form, begins as pseudo-membranous angina. In sporadic form, invasion of slight hoarseness for a day or two. There is fever, increase of the hoarseness, with hoarse, croupal cough; in most of the cases, pharyngeal exudation, and a little later, paroxysms of suffocation. |
| After the paroxysm, the child seems well, the fever disappears, or is very slight. Voice natural or only slightly hoarse; not whispering. | The fever continues; stridulous respiration; prolonged and difficult expiration; recession of base of thorax during inspiration; cough hoarse and smothered; voice hoarse and whispering. |
| If the paroxysm returns, it is during the following night, and it is less severe; the hoarseness disappears; the cough becomes loose and catarrhal. | The dyspnœa and suffocation increase; the voice and cough are smothered or extinguished; stridulous respiration persists. |
| Duration seldom more than three days. | Duration seldom less than five or six. The hoarseness continues for several weeks. |
| Very rarely fatal. | Fatal in the majority of the cases. |

The only real difficulty in the diagnosis is the distinction between the grave form and pseudo-membranous laryngitis or true croup unconnected with angina; and this, it would appear from all evidence, cannot in some cases be made with absolute certainty. The only certain and indubitable sign by which to distinguish them, is the presence of false membranes in the expectoration. The existence of this symptom is proof positive of pseudo-membranous disease, but its absence is no proof that the case must be one of simple inflammation; for, even though the membrane has been exuded in large quantities within the larynx, it is not always thrown off by the effort of coughing or vomiting. To show the difficulty of the diagnosis, we will cite the case quoted by M. Valleix (*loc. cit.*, t. i, p. 211) from M. Hache, of a child supposed to be laboring under true croup, who was sent to the Children's Hospital in Paris, in order to have the operation of tracheotomy performed. The absence of false membrane in the expectoration, and a slight remainder of clearness of the voice, occasioned the suspension of the operation. The child died, and no pseudo-membrane whatever was found in the larynx. The only lesions were moderate redness of the mucous membrane, without tumefaction, and without narrowing of the glottis; so that the fatal termination must be ascribed to spasmodic constriction of the glottis, or to tumefaction of that part which had disappeared after death.

Nevertheless, though the diagnosis is difficult, it can almost always be made out with certainty by attention to the following points. The pseudomembranous form of the disease is usually preceded or accompanied by the presence of false membranes in the fauces, which is not the case in spasmodic simple laryngitis; the symptoms of invasion of the former disease are less acute than those of the latter, the fever being less violent, and the restlessness and irritability less marked, than is usual in the simple affection, in which the general symptoms are decided from the first. The hoarseness of the voice and cough follow a different course in the two diseases; the progress of these symptoms being slow and gradual in the membranous, and much more rapid in the severe spasmodic form. The fever is marked throughout the attack in the severe spasmodic disease, whilst in the other form it seldom reaches a high degree of intensity. Lastly, the presence of portions of false membrane in the expectoration, in connection with the laryngeal symptoms, affords positive evidence of the existence of true croup.

Of the characters just enumerated as likely to aid us in distinguishing between severe spasmodic and true or membranous croup, we wish to call the reader's attention in greater detail to two, the condition of the voice, and the stridulous respiration. The former is, we have no doubt, much the most important single symptom. In membranous croup, the voice begins by being hoarse, but soon becomes weak, so that after the disease has lasted three or four days, it changes from hoarse to whispering; it becomes, in fact, suppressed. In severe spasmodic croup, the voice is hoarse at first, and becomes more so as the disease goes on, but it very rarely becomes whispering as in true croup, but almost always retains a good volume, so that when urged the child can speak out loudly. Now this is never the case in the membranous disease, for, as the fibrinous exudation is deposited on the vocal cords and in the ventricles of the larynx, it suspends almost entirely the functions of those parts, and the voice is more or less completely suppressed. The remarks just made in regard to the voice will apply also to the *cry*, which should be carefully studied in young infants.

The second very important symptom is the stridor. This is, as might be expected, more marked in all its features in true than in false croup, since in the former it depends on a permanent and considerable obstacle to the passage of the air through the larynx. That tube is, in fact, completely coated over upon its internal surface, with a more or less thick false membrane, which reduces materially its calibre, and impedes to a greater extent the passage of air, than does the mere inflammatory turgescence and swelling of the mucous membrane of the organ in severe spasmodic croup. On this account, therefore, the stridor in the respiration is louder, shriller, more persistent, more marked in the expiration, and attended with greater effort of the respiratory muscles to overcome the obstacle to the passage of the air in membranous than in severe spasmodic croup. We may add that there is something very peculiar in the cough in true croup. When the membrane has come to cover the interior of the larynx, the cough is very distinctive; it has a sound which we can describe only by saying that it always reminds us of the sneezing of a young kitten. This we have never heard in catarrhal croup, no matter how severe.

To conclude, there is in membranous croup a slow, steady, and unrelenting progression of the symptoms, which is not observed in the spasmodic disease. From hour to hour, from day to day, we can perceive, so to speak, from the gradual and steady march of the disease, that a foreign body in the form of a fibrinous moulding, is being spread slowly over the cavity of the larynx. In severe spasmodic croup, on the contrary, the course of the symptoms is less regular; paroxysms of suffocation occur as in true croup, but when these are over, the child is often quite comfortable; the symptoms indicating a much less considerable permanent mechanical obstruction than in the other affection.

Spasmodic laryngitis has been mistaken also for laryngismus stridulus. The manner in which it is to be distinguished, will be described in the article on that disease.

Prognosis.—Spasmodic catarrhal laryngitis is very rarely a fatal disease. Of its two forms, there can be no doubt that the severe is much more dangerous than the mild, since in the former the patient labors under acute inflammation of the larynx, as well as under spasm of that organ; whilst, in the latter, the amount of inflammation is so very slight as to be of little or no consequence, were it not associated with the laryngismus, which gives to the disorder its most characteristic features.

Of 109 cases of the disease of which we have kept an accurate record, none proved fatal, though 23 of these were of the grave form. We may state, also, that we have seen at least 100 more cases, of which we have no written account, in none of which was there a fatal termination. We have, therefore, never seen a case of croup without false membrane prove fatal. That it does sometimes end unfavorably, however, cannot for a moment be questioned. There are various examples of the kind scattered through the medical journals. MM. Rilliet and Barthez quote, in proof of this, two cases from the work of Jurine, in one of which an autopsy was made, and no false membrane discovered. Copland (*loc. cit.*) remarks, that in the few cases of the more purely spasmodic forms that he has had an opportunity of examining, an adhesive glairy fluid with patches of vascularity on the epiglottis and larynx, and a similar fluid in the large bronchi, were the only alterations observed.

Great imminence of danger in any case is shown by a high intensity of the stridulous sound, especially as heard in the expiration; by great severity of the dyspnœa or suffocation; by permanently whispering voice; by lividity or extreme paleness of the face; by smallness and rapidity of the pulse; by coldness of the extremities; and by delirium or convulsions.

Treatment.—M. Guersent (*loc. cit.*, pp. 367, 368) states that demulcent and mucilaginous drinks, with stimulating hand-baths and foot-baths, are the principal means that ought to be employed in the treatment of spasmodic laryngitis, or pseudo-croup. He proscribes the use of emetics and leeches as unnecessary in most cases, and is of opinion that they have come into general use, in the management of the disease, in consequence of its having been generally confounded with true croup. In a paper on croup, by the late Dr. Charles D. Meigs (*Med. Exam.*, vol. i, p. 398), may be found the following statement in regard to the spasmodic variety: "The croup sound often ceases entirely, and never returns after the exhibition of a small quantity of ipecacuanha, or any other emetic substance, even when no emesis is produced." He says in another place, that "a foot-bath with mustard, and an emetic of ipecacuanha, is in general all that is necessary for the cure."

In giving our own experience in regard to the treatment of this disease, we shall speak first exclusively of the mild, and then of the severe form, since the measures proper and necessary in the one, are very different from those called for in the other.

Treatment of the Mild Form—*Emetics.*—The great majority of cases will recover perfectly well under the use of emetics employed alone, or in combination with warm baths and revulsives. Of late years we have often succeeded in warding off the slight attack, where there has been good reason to expect it, by the administration of an opiate with syrup of ipecacuanha, at bedtime (early in the evening). At two years of age, three or four drops of laudanum, with ten to twenty drops (according to the gastric susceptibility) of syrup of ipecacuanha; at three or four years, five drops of laudanum with twenty of the ipecacuanha, are about the proper doses. Even when the child has had one attack early in the night, the use of the opiate is most successful, after vomiting, in preventing the usual return towards morning. If the physician is not called until the day after the first attack, this treatment is excellent in the evening of the second day. In cases attended with violent dyspnœa, hoarse cough, and loud stridulous respiration, the emetic should be given until it produces a full effect. In milder cases, in which there is merely loud croupal cough, with an occasional stridulous sound, nauseating doses alone will generally suffice. The most suitable emetic is, as a general rule, ipecacuanha. The best preparation for children is the syrup, of which from twenty to thirty drops may be given to those two years of age, to be repeated every ten or twenty minutes until vomiting is produced, or until the paroxysm is relieved. In very sudden cases, the Syrupus Scillæ Compositus, which is more active in its effects in consequence of the tartar emetic which it contains, might be preferable; about twenty drops of this may be given, and repeated every ten or fifteen minutes, until vomiting or the resolution of the paroxysm is obtained; but, in its employment, care should always be observed not to continue it for too long a time, lest it produce the injurious effects of tartar emetic. Of late years we have almost entirely abandoned the use of this latter emetic, as we succeed perfectly well with the ipecacuanha, and dislike more and more the antimonial preparation in children. When the dyspnœa is very urgent, or when other means fail to produce emesis, we have found nothing so effectual as powdered alum, in doses of a teaspoonful mixed with honey or molasses. (See *Treatment of pseudo-membranous laryngitis.*)

A simple and good method of treating the paroxysm is that recommended by Dr. Charles D. Meigs, in the paper referred to. It is to direct a small teaspoonful of powdered ipecacuanha to be diffused in a wineglassful of water, of which mixture doses of a teaspoonful are to be given every ten, fifteen, or twenty minutes, according to the urgency of the symptoms. This is a plan of treatment often resorted to by parents in this community, where the disease is so common and so well understood that there are few mothers who have several children, and who have had some little experience, who do not know how to treat a nocturnal attack of mild spasmodic laryngitis.

After the paroxysm is relieved, it is a good plan to direct five or ten drops of the ipecacuanha syrup to be given every two or three hours during the following day; or, if the child seems perfectly well in the morning, we may begin with these doses in the middle of the day, and continue them until bedtime. By this method, the recurrence of the paroxysm during the second night may, we think, often be prevented, and the cough is rendered free and loose much sooner than when the disorder is left to pursue its natural course. Moreover, the child ought to be kept in the house during the next two or three days, or until the cough is thoroughly loose and easy. If the child be at all a delicate one, or one in whom the disorder is prone to be obstinate, there is no plan so good as to make it sit or lie quietly in bed, sufficiently covered, with a large abundance of playthings, or with a kind nurse to read to and amuse it for two or three days.

*Baths.*—The warm bath is a very prompt and useful remedy in the disease. In all very violent cases, it ought to be resorted to immediately. It should be used also whenever the emetic fails to relieve the urgency of the symptoms, and in cases attendant with much disturbance of the circulation. The temperature of the water ought to be about 95° Fahrenheit, when the child is first immersed, to be raised gradually by the addition of hot water, to 100° or 102°. The child may remain in the bath from ten to twenty minutes.

*Bloodletting.*—Depletion is never necessary in mild spasmodic croup. The only cases that call for it are those in which the symptoms tend to assume the features of the grave form. Under such circumstances, the method of treatment would be the same as that proper for this latter affection, to the description of which the reader is referred for further information.

*Revulsives.*—The only revulsives that it can be necessary to employ are mustard foot-baths or mustard poultices applied to the interscapular space; and even these are often needless if the emetic be given. Blisters, which are recommended by some of the French writers, can only be proper in rare cases of the grave form.

*Purgatives* are required when constipation is present, or when there is so much fever on the second or third day, as to show a considerable amount of laryngeal inflammation. Under the latter circumstances some mild remedy of this class may be resorted to with a view to its evacuant effect. We have never had occasion to employ any of the *mercurials*, and believe them to be unnecessary.

*Opium* is exceedingly beneficial when the emetic, nauseant, or warm bath have failed to relieve entirely, and when a troublesome croupal cough continues after the spasm has been overcome. Laudanum, paregoric, or solution of morphia, in combination with syrup of ipecacuanha or hive syrup, or Dover's powder alone, are the most suitable preparations. It is a very good plan to give the child a moderately full dose of the opiate, with ipecacuanha, after the violence of the paroxysm has subsided. It puts the child to sleep, promotes perspiration, softens the cough, and tends to prevent the return of the spasm. Repeated once or twice early in the second night after the first attack, we believe it often assists materially to avert the recurring nocturnal paroxysm.

TREATMENT OF THE SEVERE FORM.—This form of spasmodic laryngitis requires more active measures than the mild form of the disease.

In the last edition of this work, *bloodletting* was recommended when the disorder occurred in robust and vigorous children, and a record was given of the employment of venesection in seven out of twenty-three cases, all of which recovered. Since that report we have learned that depletion is less necessary than we formerly supposed, and, as we can still say that we have never yet seen a fatal case of spasmodic croup, either simple or severe, it is fair to conclude that the disease can be safely managed without a resort to this more violent measure. Still, it is but proper to state, that should a case occur to us in a strong and healthy child, in which the breathing should become so much obstructed as to cause deep and alarming venous stasis, and in which these symptoms resisted the more simple means we now employ, we should not hesitate again, as in former years, to employ a venesection to the extent of four ounces at the age of four or five years, or a leeching to the same amount.

Since our last edition was published, we have learned also that *calomel* is less necessary than we then supposed. In fact, we rarely use it at all in these affections nowadays.

Our favorite remedies of late years have been *emetics*, *opiates*, *salines*, and the *sulphurated antimony* of the recent Pharmacopœia. When the patient is a vigorous child, and over a year old, we generally employ the following combination:

| | |
|---|---|
| ℞.—Antimon. Sulphurat., | gr. j. |
| Pulv. Doveri, | gr. iij. |
| Sacch. Alb., | gr. xij. |

M. et div. in chart. xij.

Of these powders one may be given every two, three, or four hours, care being taken to suspend the antimony when it produces any of the peculiar distress or general prostration to be described in the article on pneumonia. In such a case, we use the following combination:

| | |
|---|---|
| ℞.—Potass. Citrat., | ʒj. |
| Syrup Ipecacuanhæ, | fʒij. |
| Tr. Opii Deodorat., | gtt. xij. |
| Syrup Simp., | fʒij. |
| Aq., | f℥iss.—M. |

Dose for a child two years old, a teaspoonful every two hours.

In older children, both the potash and opiate may be doubled. In all these cases an emetic ought to be given once, or two or three times in twenty-four hours, when the dyspnœa and stridor become very severe; and in about an hour after its operation, the saline dose should be resumed. Of course, if decided drowsiness supervene from the opiate, the dose must be given at longer intervals. The emetic treatment is not so essential as in true croup, where it is so useful in causing the rejection of the false membrane which obstructs the larynx. Yet it is exceedingly useful, and often indispensable, in assisting to expel the viscid mucus secreted within the larynx, and in relaxing, for a time at least, the spasmodic constriction of the glottis, which plays a most important part in the production of the distressing dyspnœa and suffocation of the disease. They act probably also by lessening immediately, or through their action on the circulatory and nervous systems, the inflammation of the larynx. For their choice and mode of administration, the reader is referred to the article on true croup.

*Purgatives* are required merely to keep the bowels soluble; they should be repeated as may be necessary throughout the disease. If the bowels are moved every day or every other day spontaneously, there is no use in giving them at all. The most suitable are castor-oil, rhubarb, or magnesia, in small doses; or an enema may be given from time to time if the child does not resist its application.

*Expectorants* are useful after the violence of the disease has been moderated by more energetic remedies. They may consist of small doses of ipecacuanha, of antimonial wine and sweet spirits of nitre, of decoction of seneka, snake-root, or of the citrate or carbonate of potash.

*Opiates* are necessary, and are serviceable, as has already been stated, in calming excessive restlessness, and in allaying the violence of the suffocative attacks, which depend, in good part, on spasm of the glottis. The most suitable are Dover's powder or some other preparation of opium, or small doses of belladonna, or hyoscyamus.

Belladonna would seem, from its power to relax the sphincters, and from its excellent effects in hooping-cough, to be indicated in this disease, but we have succeeded so well with opium that we have not often used belladonna. Probably a combination of the two would be found beneficial.

A warm *bath* at 97°, or 98°, employed once or twice a day, and continued for a period of ten or fifteen minutes, often assists greatly in lessening the sufferings of the child, in calming restlessness, and in moderating the heat of skin and violence of the circulation, when the latter symptoms are strongly marked. The same effects may often be obtained by the use of *counter-irritants*, as sinapisms, mustard poultices, mustard foot-baths, &c. *Blisters* are of doubtful propriety in any cases.

HYGIENIC TREATMENT.—In either form of the disease the child should be placed for the time in a warm room, and warmly clothed. If old enough, it ought to be kept as much as possible in bed during the paroxysm. If so young as to prefer the lap of the nurse, it should be clothed in a long loose wrapper in addition to its usual night-dress. It is very important to confine the child during the whole term of the acute period in the bed, if it is over three or four years old, and in the crib or lap, if it be younger. Even after the cessation of the acute condition, it ought to be kept in the house for a few days, in order to make sure of the convalescence. The diet must be simple and of easy digestion, so long as there is any disposition to recurrence of the disease. It may consist of preparations of milk, of bread, rice, or of thin chicken or mutton water. Meat and most vegetables had better be avoided, until the convalescence is fairly established.

PROPHYLACTIC TREATMENT.—It is certain that much may be done by a wise attention to physical education, to prevent attacks of the disease in children who show a liability to it. We would strongly recommend, with this view, attention to the following advice given by M. Guersent, who says (*loc. cit.*, p. 381): "It is possible, to a certain extent, to prevent attacks of pseudo-croup, if we fortify the constitutions of children, by exposing them well-clothed to a dry and elastic atmosphere, particularly if they can be kept in constant movement. But of all the precautions which have been found unquestionably advantageous, that which seems most useful is to make them sleep in well-ventilated, dry, carefully closed chambers, having a southern exposure, and always without fire. We have several times been convinced of the utility of this habit in families the children of which were subject to this kind of catarrh."

There can be no doubt that the style of dress used for children in this country, must occasion many and repeated attacks of croup which might just as well have been avoided. The custom is to dress children between the ages of one and four or five years, in such a way as to expose to the air, the whole of the neck and the upper half of the thorax (for the dresses are made so low and loose at the shoulders, as to leave the upper part of the chest virtually uncovered). The arms are left bare, as are also the legs from the knee, or above the knee, to the ankle, so that very nearly half of the cutaneous surface is without covering, and this, too, in the very same rooms and temperature in which sit the parents with the body and limbs warmly clothed to resist our climate, at all seasons changeable and uncertain, and, in the winter, very cold. We are perfectly well convinced that this faulty and unreasonable system of dress, which is chosen because it is the fashion, or in order to *harden* the child, who, however, invariably puts on warm clothing when it comes to years of discretion, will explain in part the enormously greater frequency in children than in adults, of the various diseases of the air-passages and lungs produced by cold.

One of the most important means of prevention, therefore, is the adoption of a suitable dress. In winter this should consist of one that shall cover the body completely. If the child be at all delicate, it ought to wear next to the skin a woollen jacket with long sleeves, and covering the chest to the neck. Over this should be put a long-sleeved stout muslin dress, or one of some light woollen material, made in the same style. In young children, the stockings ought to be of wool, and should reach to the knees; in older ones, they may be shorter, but the legs should be covered with drawers made of canton flannel, of thick cotton stuff, or of light woollen flannel. To show the influence of dress, Dr. Eberle mentions the fact that in the country, and especially amongst the Germans who cover the neck and breast, croup is a very rare disease. During a practice of six years amongst that class of people, he met with only one case of the disease.

When the liability to the disease continues after the completion of the first dentition, we have found the daily use of the cold bath, in connection always with warm clothing, most useful in preventing the attack. The bath must be commenced with in the summer, and persevered in through the following winter. The water, after the cold weather begins, should be drawn in the evening, allowed to stand all night in a room in which there is a fire through the day, and made use of on the following day. Prepared in this way, we have found the water in the morning at a temperature of between 50° and 60° F. The child ought to be kept in the water only half a minute or a minute, then well rubbed, and dressed immediately.

When the child is pale, weak, and feeble, and unable to bear exposure to the outer air, it may generally be restored to much better health by careful attention to diet, and by the steady and long-continued use of some tonic remedy. The diet ought to consist of bread and milk, and of meat and the simpler vegetables, as potatoes and rice. The tonics most generally suitable are quinine or iron. Of the quinine a grain may be given in pill or solution, twice or three times a day; while at dinner or lunch, or at both, the child should be made to drink from a dessert to a tablespoonful of port wine, mixed with water. This method ought to be steadily persevered in for from three to six weeks or longer. If quinine be objectionable for any reason, iron must be substituted. The best preparations are the iodide or the metallic iron.

## ARTICLE III.

### PSEUDO-MEMBRANOUS LARYNGITIS, OR MEMBRANOUS OR TRUE CROUP.

**Definition and Synonymes.**—Pseudo-membranous laryngitis is an acute inflammation of the mucous membrane of the larynx, attended with the exudation of false membrane.

It is the croup of the French writers, while, in this country, it is called by the various names of slow, creeping, true, membranous or inflammatory. The term given above seems most suitable, as expressive of the real nature and seat of the disease, and we shall, therefore, make use of it in contradistinction to that of spasmodic laryngitis or spasmodic or false croup, which is a much more common and less dangerous affection.

**Nature and Relations.**—By most authorities, true croup is regarded as an idiopathic primary inflammation, presenting the unusual result of pseudo-membranous exudation, and differing thus from diphtheritic croup, which is a mere complication in the course of a constitutional disease, depending upon the extension of the false membrane from the fauces into the larynx.

The considerations upon which this distinction is based may be briefly stated as follows: that true croup is a disease peculiar to childhood, and that many of its peculiarities are to be explained by reference to the development of the larynx at that period; that it is not connected with any special alteration of the blood crasis; that it nearly always commences in the larynx, and, though it may pass downwards into the trachea, never passes upwards into the pharynx; and finally, that it does not present the complications of diphtheria, such as albuminuria and pseudo-membranous exudation on abraded surfaces, nor its characteristic paralytic sequelæ.

So far as the mere anatomical conditions are concerned, it is generally conceded that there is no essential difference between primary croup and pseudo-membranous croup occurring in the course of diphtheria. The attempt was made by M. Isambert to base a distinction between the two affections upon the ulcerated condition of the mucous membrane of the larynx in diphtheritic croup, but West has met with similar ulceration in cases of primary croup, though somewhat less frequently than in the secondary diphtheritic form.

But further, our personal experience constrains us to state that the differences between the two forms of membranous croup above enumerated, have not seemed to us sufficiently marked and constant to positively establish their essential diversity; and that it is our decided opinion that the vast majority, if not all, of the cases usually termed pseudo-membranous laryngitis are in reality instances of primary laryngeal diphtheria, in which the constitutional symptoms are not grave, and where the faucial deposit has been very slight and perhaps even overlooked.

We are led to this conviction especially by the repeated observation of cases in private practice, where we have been summoned upon the first symptoms of indisposition, and have found a trifling amount of membranous exudation on the fauces, which, in a day or two, had disappeared, while the symptoms of croup supervened.

Apart from their sporadic occurrence, we confess that we are altogether unable to detect any difference between such cases and the cases of so-called primary laryngeal diphtheria, frequently met with in epidemics of diphtheria, where the angina is but trifling, and is rapidly followed by pseudo-membranous formation in the larynx.

It is true that the primary sporadic form of croup we are now discussing occurs more exclusively in children than does the more fully developed form of diphtheria; but it must be remembered that in childhood there seems to be a peculiar tendency for the larynx to become involved in the course of diphtheria, and also that a comparatively trifling amount of membranous exudation in a child's larynx will produce grave symptoms of obstruction.

It is also true that these sporadic cases are rarely attended with albuminuria or followed by paralytic sequelæ; but when we consider the remarkable variations in the frequency of these conditions in different epidemics of diphtheria, it is not inconsistent that they should be usually absent in mild sporadic cases.

It is not our intention in the above remarks to deny the possibility of pseudo-membranous laryngitis occurring as a purely primary idiopathic affection, and we have consequently treated of it as a special disease apart from the brief notice of it we have given in the article on diphtheria.

But the considerations which we wish to impress deeply upon the mind of the reader are, that in the vast majority of cases of true croup careful examination of the throat at an early period of the attack will show the presence of exudation on the tonsils or pharynx; and that, consequently, whenever a child is taken sick with even the most trifling croupy symptoms, the throat should be immediately and repeatedly examined, and if any membranous exudation be detected, the case should be regarded as probably one of membranous croup, a most guarded prognosis accordingly given, and the most careful treatment immediately instituted.

FREQUENCY.—The mortality from this disease is in all years considerable, as will be seen from the subjoined table:

| Years. | Mortality from Croup. | Mortality from Diphtheria. | Total Mortality, less Stillborn. |
|---|---|---|---|
| 1838, | 101 | 0 | 4,118 |
| 1839, | 83 | 0 | 4,765 |
| 1840, | 79 | 0 | 4,593 |
| 1841, | 100 | 0 | 5,456 |
| 1842, | 137 | 0 | 5,558 |
| 1843, | 129 | 0 | 5,155 |
| 1844, | 179 | 0 | 5,187 |
| 1845, | 176 | 0 | 5,882 |
| 1846, | 111 | 0 | 5,944 |
| 1847, | 121 | 0 | 6,881 |
| 1848, | 177 | 0 | 7,268 |
| 1849, | 130 | 0 | 8,989 |
| 1850, | 151 | 0 | 8,034 |
| 1851, | 180 | 0 | 8,374 |
| 1852, | 208 | 0 | 9,745 |
| 1853, | 303 | 0 | 9,184 |
| 1854, | 304 | 0 | 11,280 |
| 1855, | 265 | 0 | 9,906 |
| 1856, | 268 | 0 | 11,720 |
| 1857, | 256 | 0 | 10,331 |
| 1858, | 292 | 0 | 10,162 |
| 1859, | 312 | 0 | 9,084 |
| 1860, | 354 | 307 | 10,849 |
| 1861, | 304 | 502 | 13,838 |
| 1862, | 258 | 325 | 14,386 |
| 1863, | 443 | 434 | 15,045 |
| 1864, | 455 | 357 | 16,794 |
| 1865, | 350 | 260 | 16,453 |
| 1866, | 289 | 192 | 16,005 |
| 1867, | 185 | 118 | 13,153 |
| 1868, | 206 | 118 | 13,949 |

It is difficult to estimate the number of deaths due to this affection during the last nine years, since diphtheria has made its appearance in the mortality lists of the city, as many cases of diphtheritic croup have unquestionably been returned as mere pseudo-membranous laryngitis.

True croup is, however, rare in comparison with false croup, since while we have seen but 35 cases of pseudo-membranous laryngitis, we have met with upwards of 200 of the catarrhal form. In the following remarks, and in those on the causes of croup, we refer the reader also to the table in the article on diphtheria, showing the comparative monthly and annual mortalities from these two diseases.

From a glance at the accompanying table, it will be seen that since the prevalence of diphtheria, the mortality from croup has not increased disproportionately to the increase in general mortality; and that, during the past three years, in which there was a marked decrease in general mortality, despite the occurrence of over 100 deaths from diphtheria in each year, the mortality from croup has also fallen even below the average sustained for many years previous to the appearance of diphtheria in the mortality lists. No change whatever has occurred in the type of this disease during the past ten years, for the experience of one of us for a number of years before the term diphtheria came into use and appeared in the mortality returns of this city, enables us to attest the fact that pseudo-membranous laryngitis, both of the primary and of the more grave diphtheritic form, occurred then precisely as it does now.

Predisposing Causes—Age.—The disease is far most frequent between the close of the first and fifth years. Thus of 2136 fatal cases reported in this city during the past 7 years, 301 were under 1 year of age; 571 between 1 and 2 years; 951 between 2 and 5 years; or, 1522 between 1 and 5 years; and 236 between 5 and 10 years; leaving but 77 cases as occurring after the latter period of life.

Of the 35 cases that we have seen, 28 occurred between 2 and 7 years of age, while of the remaining 7, 1 occurred at the age of 18 months, 1 at that of 19 months, 1 at 7½ years, 2 at 11 years, and 1 each at 11½ and 12½ years.

Sex cannot be said to exercise any decided influence upon the frequency of the disease. Thus of the above 2136 cases, 1115 occurred in males, 1021 in females.

Constitution.—A feeble and delicate constitution is thought by some to be a powerful predisposing cause, but this is at least very doubtful.

Of the 35 cases referred to, 26 occurred in healthy vigorous children, while the remaining 9 occurred in children who, though neither very weak nor very sickly, presented a rather delicate appearance.

Season exerts a very powerful influence upon the development of croup. Thus the mortality from it attains its maximum during the months of November, December, and January, during which quarter about four times as many deaths occur from croup as during the months of June, July, and August. It is, however, comparatively frequent from October to March inclusive.

The relation between the mortality from croup and the temperature appears to be a definite and quite constant one, since, as will be seen by referring to the table in the article on diphtheria, with the single exception of February, the mean monthly temperature and the mean monthly mortality from croup rise and fall together throughout the entire year.

The *exciting causes* are but little understood. The only ones which seem to have been ascertained with any certainty, are the application of irritating agents to the laryngeal mucous membrane, and exposure to cold and even these are questioned by the most accurate observers. In none of the cases that we have seen could the exciting cause be even suspected.

SECOND ATTACKS of membranous croup, though rare, are mentioned as occurring by several authors; and, in our remarks on tracheotomy, we quote from Millard an allusion to five cases, in each of which the operation was twice successfully performed for successive attacks of this disease.

We have ourselves met with two instances in which second attacks occurred. One was a girl, who had her first attack at the age of 11½ years and her second at the age of 12½, and recovered from both without the operation. The second patient was a boy, who had his first attack, a very severe one, but from which he recovered without tracheotomy, at the age of 5½ years; and his second attack, which is fully detailed at the end of the article on Tracheotomy (Case 1) at the age of 7½ years.

ANATOMICAL LESIONS.—The false membrane may cover the whole mucous membrane of the larynx, and extend into the pharynx, trachea and bronchia; or it may be confined to the larynx, either forming a complete lining to the cavity of that organ, or consisting merely of patches of various sizes, with intervals of mucous membrane destitute of exudation.

It is, in the first place, important to ascertain the proportion of cases in which the deposit extends into the bronchia, and those in which it remains limited to the larynx, or larynx and trachea, as the determination of this point has some bearing upon the question of the propriety of the operation of tracheotomy. It appears from a table given by M. Guersent (*Dict. de Médecine*, t. ix, p. 346), containing the results of cases collected by M. Hussenot from various sources, and of autopsies made by M. Bretonneau, numbering in all 171, that in 78 the membrane did not extend beyond the trachea, and that in 42 it invaded the bronchia, and in 30 the condition of the bronchia was not mentioned; and in 21 there were no false membranes; so that of 120 cases, in which the extent of the false membrane was accurately noted, it was confined to the larynx and trachea in 78, and extended into the bronchia only in 42; or in about one-third of the cases. This proportion is the same that Millard gives (*De la Trachéotomie dans le cas de Croup*, *Thése de Paris*, 1858), in his masterly memoir upon croup, after an analysis of a large series of cases. Our own experience, based upon 10 cases in which we ascertained with exactitude (by autopsy and by tracheotomy) the extent of the membrane, would indicate that it passed into the bronchia in a larger proportion of cases; since in 5 of these 10 cases the exudation extended beyond the trachea. It is to be borne in mind, however, that the cases upon which these calculations are based have very frequently resulted fatally, and presented extensive formation of pseudo-membrane in the bronchia; and it is probable that it really exists there in other instances, but to a much less extent, so that recovery takes place, and renders it impossible to determine accurately the extent of the exudation.

The proportion of cases in which the pharynx is implicated is also important, since it affects the diagnosis of the disease, and indeed bears upon the question of the identity or non-identity of pseudo-membranous laryngitis and diphtheritic croup.

In considering the statements of authors upon this subject, it is evident that much of the diversity in their opinions depends upon the fact, that they are not in reality all referring exclusively to this particular affection. Thus the assertion of M. Guersent (*Dict. de Méd.*, t. ix, p. 339), that in nineteen-twentieths of the cases the exudation begins in the pharynx, is evidently to be explained on the supposition that this distinguished practitioner had been observing a series of cases of diphtheria in which the exudation had extended into the larynx. MM. Rilliet and Barthez, on the other hand, state that a majority of the cases observed by themselves, and of those of M. Hache also, commenced in the larynx. Dr. West also reports 11 cases of idiopathic croup, in only two of which was there any formation of false membrane upon the velum and tonsils.

In 31 cases observed by ourselves, in which the condition of the throat was recorded, the croup followed membranous angina in 21 cases; in 5 the disease began in the larynx, but was attended later with small deposits upon the tonsils; and in 5 only was there no deposit on the throat at any time.

The fauces and pharynx do not present any constant alterations in cases of croup. Frequently, however, the mucous membrane is red and swollen, and there may be patches of membranous exudation upon the tonsils, velum, half-arches, or on the pharynx. These patches are usually thin, whitish, and may not persist more than 24 to 48 hours, disappearing and being succeeded by similar formations in some other part of the throat.

We believe indeed that such patches of exudation will be found in a large proportion of cases during the first two or three days of the attack; and that they are not more frequently observed, chiefly because the symptoms are usually so slight during this stage, that either no medical attendant is summoned, or his attention is not attracted to the throat.

The most important and characteristic morbid appearances are, however, to be found below the glottis, and consist in the presence of pseudo-membranous exudation, and of certain alterations in the respiratory mucous membrane.

The false membrane may be limited to the larynx, or to the larynx and trachea; or it may extend over these parts and into the branches of the bronchi, even to the third and fourth division. In the larynx, trachea, and even the primitive bronchi, it may appear merely as patches of various sizes, with intervening spaces of vascular mucous membrane; but in the smaller air-passages it usually takes the form of complete tubes lining the bronchus. In some cases, such tubular casts may be formed continuously from the larynx down to the minute bronchioles, completely lining the air-passages. It is undoubted, that in the more sthenic idiopathic form of membranous laryngitis, the membrane is more apt to extend deeply into the ramifications of the bronchi, than when it occurs as a complication of diphtheria.

The false membrane is commonly of a yellowish-white color, and from a fifth of a line to a line in thickness. Its consistence is generally considerable, and it is usually somewhat elastic; indeed the more white and fibrous varieties possess a degree of firmness and toughness that renders it difficult to tear the membrane, or teaze it out with needles. It is an almost invariable rule, that the membrane lining the upper part of the air-passages is more white and firm than that found in the smaller bronchi; so that it frequently happens, that, on drawing out the firm white tubular membrane lining the larynx, trachea, and primary bronchi, it is seen to terminate in branches which grow progressively softer, more yellow and purulent, as they become smaller and smaller.

The free surface of the pseudo-membrane is usually covered with puriform mucus, while the attached surface is adherent with various degrees of force to the mucous membrane beneath. The strength and closeness of these adhesions are often proportionate to the firmness and toughness of the false membrane itself. In the larynx and trachea it is often necessary to employ a good deal of force to separate the exudation from the mucous membrane, and innumerable little fibres are seen passing from one to the other, as though they were processes of exudation dipping into the minute orifices of the mucous follicles. On the other hand, the adhesion between the exudation and mucous membrane is rarely close in the smaller bronchi, or in cases where the pseudo-membrane in the larynx and trachea is less firm and consistent.

These false membranes consist, according to Hasse, mainly of fibrin blended with mucus in various proportions. (*Path. Anat.*, Syden. Soc. ed., p. 278.) On microscopic examination, they present a more or less close fibrous basis, consisting of interwoven fine fibrils, with imbedded cells in varying number; these cells presenting the ordinary appearances of exudation corpuscles, being round, granular, and containing from one to three small nuclei. The action of various chemical reagents upon them will be found detailed in the article on diphtheria.

The mucous membrane beneath the exudation presents various shades of redness, or it is purplish, or even ecchymosed and blackish. It is also swollen, and may be slightly softened or friable, and has a dull excoriated appearance, though actual ulceration very rarely exists. West mentions the occurrence of small aphthous ulcers about the edges of the rima glottidis and the arytenoid cartilages, as a frequent lesion in idiopathic croup; but the same lesion has been observed in the diphtheritic form of the disease.

There is also vascularity, though usually to a less marked degree, of the bronchial mucous membrane at the points where no exudation exists.

The lungs present some abnormal condition in the great majority of cases. Bronchitis and pneumonia are frequent complications of the disease; and in addition there is often collapse of larger or smaller portions of lung-tissue from occlusion of some bronchus by the pseudo-membrane.

In other instances, or frequently in conjunction with collapse of portions of the lungs, the violent respiratory efforts induce either vesicular or even interstitial emphysema, especially of the anterior borders of the lungs.

The morbid appearances found in cases where the croup has followed diphtheritic angina, will be fully described under the head of this latter disease.

In the secondary croup of measles, the appearances are very similar to those observed in primary cases, while in that of scarlet fever the exudation differs in being less consistent and less uniformly spread over the diseased part. In the last-named malady, the membrane is thinner and less adherent, and, in some cases, puriform, soft, and of a grayish color. It is usually poor in fibrin, and prone to decomposition. The mucous membrane is generally discolored and softened.

SYMPTOMS.—In the majority of cases, the development of the symptoms characteristic of croup is preceded for a few days by the ordinary symptoms of catarrh and slight sore throat. The child is feverish and drowsy; there is cough, which may possess a slight croupy character at some period of the twenty-four hours, but more frequently seems like an ordinary catarrhal cough; coryza is very rarely present, but there is slight soreness behind the angles of the jaws, and the fauces are seen to be reddened, and probably small, thin patches of pseudo-membrane may be visible on the tonsils or fauces. This early stage lasts a variable time, usually from one to three or four days, and is more or less gradually succeeded by the symptoms indicative of laryngeal obstruction.

When, on the other hand, the disease begins in the larynx, the invasion is marked by hoarseness of the voice, and hoarse, croupal cough, which often continue for one, two, or three days, until the disease has made considerable progress, before the parents deem it necessary to send for a physician. In a case that came under the observation of one of ourselves, the child was playing about the room at a time when he had hoarse, whispering voice, and cough, and stridulous respiration. In another we were not called until the evening of the third day, though the child had had stridulous cough and respiration for two nights; but, as he always seemed better in the morning, it was not thought necessary to send for a physician, until after he had become violently ill. In a third case there was hoarseness of the voice and slight croupal cough during the afternoon of one day and the ensuing night, and the next morning fully developed croup, with fibrinous patches on each tonsil. These symptoms are not generally accompanied by fever at first. The appetite is usually unimpaired, the thirst scarcely augmented, and the child, though somewhat dull and languid, is disposed to be amused at times. In other and severer cases, on the contrary, the disease becomes aggravated much more rapidly, and may soon lead to a fatal termination.

The change of the *voice* is the first symptom observed in the cases which begin in the larynx. It has always been described to us as hoarse, like that which is heard in an ordinary cold. As the disease progresses, the voice becomes more and more hoarse and difficult, until at length it is reduced to a mere whisper. The degree of the hoarseness varies, however, to a very great degree in the same case, the diversities depending probably upon the amount of the spasm of the larynx at the moment, and upon the state of the exudation. We have several times observed the voice to become much stronger and clearer after the operation of an emetic, in consequence no doubt of its relaxing effect upon the glottis. The *cough* is peculiar. At first slightly hoarse, it becomes, as the case goes on, very hoarse and hollow, and then short and smothered. It is variable in frequency, and is apt to occur in paroxysms, which are often very troublesome from their frequent recurrence. Towards the termination of the disease in fatal cases, or whenever the case is very severe, it is altogether different in character from what it was at the beginning, becoming short, instantaneous, and smothered, so that it might very well be called whispering. As the disease progresses, it is accompanied by stridulous respiration, in which a hoarse, rough, hissing, or crowing sound is produced by the rush of the air through the constricted larynx. This sound is usually heard at first only during forced inspirations, and is therefore noticed first during the long inspiration which precedes coughing. Next it is heard during the violent respiratory movements which accompany the act of crying; and as the larynx becomes more and more clogged with the exudation, it occurs during both inspiration and expiration, in every act of respiration, and is so loud as to be heard over the whole room, or even in adjoining rooms.

The *respiration* is natural in the early part of the attack, but as the voice and cough assume their characteristic features, and the stridulous sound is established, it becomes more frequent, rising to 28, 32, 40, and 48 in the minute. At first easy and natural, it becomes, during the height of the symptoms, and especially in fatal cases, the most frightful dyspnœa we have seen in any disease. Every movement of inspiration requires the whole force of the inspiratory muscles to lift the walls of the chest, and enable the air to find its way through the narrow and obstructed glottis: each expiration, instead of being short and easy, as in health, and in nearly all other diseased conditions, requires a slow and laborious contraction of the expiratory muscles to expel from the lungs the air which they contain, and which hisses through the larynx with a sound nearly as loud as that produced during inspiration. The dyspnœa just described is for the most part constant, but exhibits paroxysmal aggravations from time to time.

When a paroxysm of dyspnœa occurs, the expression of the child is that of the most terrible anxiety, or of the wildest terror. In some instances, the face becomes deeply red, then blue, livid, and finally pale and white, and for a moment life may seem extinct. In other cases, in which the dyspnœa is constant, the face is of a dusky red color, the expression anxious and haggard, and the child either lies on its side with the head thrown far backwards in a state of somnolence, or constantly changes its position from restlessness without noticing anything around it.

Jacobi (*Amer. Jour. of Obstet.*, May, 1868, pp. 13–65) lays particular stress upon the fact that in membranous croup the dyspnœa exists both in inspiration and expiration, whereas in spasmodic catarrhal croup it is chiefly present in inspiration, and is due, he thinks, to paralysis of the crico-arytenoid muscles from œdema and infiltration, so that the vocal cords are brought into contact during inspiration.

There is one further peculiarity about the dyspnœa in membranous croup to which we would direct especial notice, since we regard it as of the utmost importance. This consists in the occurrence, in certain cases, of a deep sulcus around the base of the chest, and of recession of the lower part of the sternum and the epigastrium during the act of inspiration.

These phenomena are, perhaps, partly due to the violent action of the diaphragm, but undoubtedly their chief cause is the atmospheric pressure, which acts here, as it has been clearly shown by Jenner to act also in rickets to produce the deformities of the thorax characteristic of that disease. The normal relation which exists between the firmness and resistance of the thoracic walls, the power and rapidity of contraction of the diaphragm, the elasticity of the lungs, and the size of the orifice of the larynx, is here disturbed by the greater or less degree of occlusion of the larynx by membranous exudation. The calibre of the larynx being thus diminished, so that air enters the lungs but slowly, and the diaphragm contracting violently, there will necessarily be recession of the softer parts of the chest walls at each inspiration.

The persistence of these phenomena during inspiration for even a short time is, we believe, in the highest degree characteristic of the presence of false membranes in the larynx; and when, despite the use of emetics, this form of respiration continues, it constitutes one of the strongest indications for the performance of tracheotomy.

There is no *expectoration* early in the disease, or it consists of yellowish viscous mucus. At a later period, there is usually expectoration of false membrane, sometimes in the form of a complete tube, or, much more frequently, of small, irregular fragments, mixed with mucus, or with the matters ejected from the stomach by vomiting. To detect the membrane, the substances expectorated or vomited ought to be placed in water, when the former detaches itself from the mucus and other matters, and is easily recognized. It is not voided in all cases in which it is known to be present in the larynx.

Thus of the 35 cases observed by ourselves, it was expelled by vomiting or coughing in 12; in 21 none was rejected, though its presence in each case was proved by the character of the symptoms and by its existence in the fauces, by autopsy, or by the operation of tracheotomy; in one there was expectoration of masses of viscid, yellowish fibrin, though none of membrane; and in one there was no positive evidence of its existence. M. Valleix (*Guide du Méd. Prat.*, t. i, p. 330) states that of 51 cases, in which the symptoms were very carefully observed, no traces of the exudation could be discovered either in the expectoration or in the matters rejected by vomiting in 26, though its existence was proved by post-mortem examination.

AUSCULTATION.—In the severe cases of true croup that have come under our notice, auscultation has been of little or no aid. In fact, the

very important to determine, when the question of tracheotomy come
be mooted in any case.

In cases in which the laryngeal obstruction is not very great, and th
stridulous sound consequently less loud, we may auscult the chest
some profit. The vesicular murmur is then either natural, or altered a
cording to the state of the lung.

But, though such has been our own experience in regard to auscul
tion in croup, MM. Barth and Roger (*Trait. Prat. d'Auscultation*, 2me
ed., p. 255 and 261) describe, as a sign of croup with floating false mem
brane, a kind of vibrating murmur, or *tremblotement*, as though a movab
membranous veil were agitated by the respired air, and which can b
heard when the stethoscope is applied over the larynx or trachea. If this
sound be heard only in the larnyx, and not in the trachea and bronchia,
it indicates the plastic exudation to be of small extent, and likely to b
rejected by expectoration, and the prognosis is favorable. In the other
case, on the contrary, it shows the disease to be of considerable extent,
and the prognosis becomes much more serious.

This question will be found referred to more fully in our remarks on
the indications for the operation of tracheotomy.

There is a slight *febrile movement* at the onset, or a day or two afte
the appearance of the earliest symptoms. When the disease is fully
established, the fever becomes violent. The pulse rises to 130, 140, 160
or even higher; it is generally regular and strong at first, but as the cas
progresses, becomes small, feeble, and very rapid. In one of the par
oxysms that we witnessed, it became so rapid that it could not be counted
and at last ceased to beat at either wrist for a few instants. The hea
and dryness of the skin are very moderate at first, but increase as th
disease reaches its maximum, to diminish afterwards gradually, and i
fatal cases, to be replaced by coldness, with copious clammy perspira
tions. The strength is not diminished at first, but as the disease prog
resses, becomes more or less so in proportion to the violence and dura
tion of the case. The *digestive organs* are but little disturbed by th

of pseudo-membranous angina, ought always to be sought for, and when present, lends additional support to the diagnosis.

The *mode of recovery* in favorable cases is different in different instances. In some it is sudden, taking place rapidly and steadily after the expectoration of a tubular-shaped membrane. The rejection of the deposit in this form, is, however, a rare event, and is not always followed by recovery. We have seen in this city three distinct tubules of false membrane, which were thrown from the larynx of the same child at intervals of two days each. The first was the largest, and came evidently from the whole length of the larynx and trachea; the second was somewhat shorter, and the third not more than half so long as the first. The child was greatly relieved for some hours on each occasion of the rejection of a tubule, but then became more oppressed as the exudation again collected. It sank from exhaustion after the third came away.

As a general rule, the recovery is slow and gradual. After free vomiting, after the expectoration of fragments of false membrane mixed with mucus, or, as happened to ourselves in two cases, after the expectoration of masses of tough yellowish fibrin, or, lastly, after the rejection of mucoid and frothy sputa only, the symptoms gradually ameliorate; the stridulous respiration slowly subsides, and at last disappears; the cough, which was short, hoarse, and smothered, becomes louder, stronger, less hoarse, and what is still more favorable, loose; the aphonia moderates, but very slowly; the fever disappears; appetite and gayety return; and after a variable length of time, the child enters into full convalescence. The hoarseness of voice very generally continues for several days after all the other symptoms have lost their dangerous character, and sometimes lasts for weeks. In one case, the voice was still weak and hoarse on the tenth day, and in another during the seventh week. (*See a paper on Croup, by J. F. Meigs, M.D., Am. Jour. Med. Sci.*, April, 1847.)

DURATION.—Death has been known to occur on the first, second, and third days, but such cases are rare. The duration of the disease may be stated at from three to thirteen days, as its most common term. The cases seen by ourselves lasted from five to fourteen days.

DIAGNOSIS.—There can be no difficulty in recognizing the presence of pseudo-membranous laryngitis, when the development of the symptoms of laryngeal obstruction has been preceded for several days by angina, with or without membranous exudation, and hoarseness of voice and cough. For the relation which exists between such cases and diphtheritic croup, the reader is referred to the remarks at the beginning of this article on the nature of croup, and to the remarks made under the head of diagnosis in the article on diphtheria.

When, however, the disease begins in the larynx, and especially when there is no exudation whatever in the fauces, the diagnosis becomes more embarrassing, since under these circumstances there are two other laryngeal affections with which true croup may be confounded,—to wit: false croup or spasmodic catarrhal laryngitis, and laryngismus stridulus. The mode of distinguishing between these different disorders has been carefully described in the remarks on diagnosis, under the head of the former disease. We wish in this place merely to call the attention of the reader, and particularly of the young practitioner, to the extreme importance of the differential diagnosis between the disease now under consideration and false or spasmodic croup, since the former is one of the most dangerous and frightful disorders to which children are subject, demanding vigorous and active treatment from the start, at which period only is medical treatment likely to be successful; whilst the latter, though of a much more threatening aspect at the beginning, is in fact a mild and safe disease in comparison, and one rarely requiring other than very simple treatment.

In this connection we would urge again the extreme importance of a careful examination of the throat in every case where there are even the most trifling croupy symptoms present, since if membranous exudation be present either on the pharynx or tonsils, there is great danger that the laryngeal symptoms are due to an extension of the false membrane.

PROGNOSIS.—Pseudo-membranous laryngitis is a very fatal disease. In its sporadic form it is decidedly less dangerous than when it occurs in the course of epidemic diphtheria, owing to an extension of the exudation from the fauces into the larynx, but it still ought, at all times and in all shapes, to arouse the utmost caution of the practitioner.

MM. Rilliet and Barthez state that its common termination is in death. M. Valleix says that "to speak in general terms, it is fatal when not treated energetically." M. Guersent (*loc. cit.*, p. 365), after a careful consideration of the statements of various authors, says: "In fact, true croup is one of the most dangerous of all diseases; it is generally fatal." He adds that he has seen at least 100 cases of spasmodic croup, without a single death, while of 10 children attacked with true croup, it is scarcely possible to save two.

We have ourselves seen upwards of 200 cases of spasmodic or false croup, all of which without exception recovered, while of 35 cases of true croup that we have seen 16 died.

The danger is great in proportion as the child is younger and more feeble, and in proportion to the rapidity of the case and the degree of the dyspnœa. The most unfavorable symptoms are: loud stridulous sound heard both in the inspiration and expiration; laborious and prolonged expiration; recession of the base of the thorax during inspiration; whispering voice or complete aphonia; congestion of the face and neck; somnolence; weak, rapid, and irregular pulse; cold extremities; and cold clammy perspirations. The favorable symptoms are: expectoration of false membranes; diminution of the stridulous respiration; the change from whispering to hoarseness or to clearness of the voice; looseness of the cough; moderation of the fever; improvement of the temper and moral state; and amelioration of the general condition.

The case should not, however, be abandoned as hopeless until life is actually extinct. An instance has been elsewhere put on record by one of us (*see paper by Dr. J. F. Meigs, loc. cit.*) of the recovery of a child after momentary suspension of animation from asphyxia on two occasions, though these attacks were followed by a dreadful illness of two days.

TREATMENT.—We are desirous, at the beginning of our remarks upon the treatment of this disease, to express the opinion, that none is *likely* to succeed, unless it be applied early in the case, and by this we mean, in the course of the first, or at the latest, second day. And not only should it be commenced early, but the most active remedies ought to be applied at this period, in their full force. The very moment there is good reason to suppose that a case will prove to be one of membranous croup, the most energetic means ought to be brought to bear upon it, and if this be done from the first, or even second day, we cannot but hope that a considerably larger proportion of recoveries may take place, than has heretofore been thought possible.

In the study of the treatment, it will be necessary to rely chiefly upon the works that have been published since the distinction between the two forms of croup has been correctly drawn, for it is impossible to place much dependence on the assertions of previous writers, inasmuch as their opinions in regard to the effects of treatment must have been formed from indiscriminate experience in two very opposite maladies. It is only necessary to recollect the enormous difference in the mortality of the two affections, to be convinced that the success of any plan of treatment in the one, is no fair argument for its probable success in the other. Thus M. Guersent has seen a hundred cases of spasmodic laryngitis, without a single death; while he believes that of ten cases of the pseudo-membranous form, scarcely two can be saved. We have ourselves attended and kept a record of one hundred and nine cases of spasmodic croup, and have seen a large number of cases besides, of which we have no notes, without a single death; whilst of thirty-five cases of true croup that we have met with, sixteen proved fatal. The most important objects to be held in view in the treatment, are the following: to prevent, if this be at all possible, the formation of false membrane; after its production, to cause its dissolution, or render it less adherent; to provoke its expectoration; to prevent its reproduction after it is once expelled; to subdue the inflammatory diathesis which exists; and to allay the painful symptoms.

Bloodletting.—Many authors award to bloodletting the first place in importance amongst the medical means in our possession, and it seems to be regarded by many in this country as an indispensable agent in the cure. Moreover, there are not a few who believe that, when promptly and boldly resorted to, it will seldom fail in arresting the disease.

The more careful and extended study which this question has received during the past few years, however, has led many observers to doubt the efficacy of venesection in arresting the course of this inflammation, or preventing the formation of membranous exudation.

In those cases where croup supervenes in the course of epidemic diphtheria, there can be no doubt that bloodletting is entirely contraindicated; and the same remark may be made of those sporadic cases of pseudo-membranous laryngitis, where the onset of the disease is slow, and its course gradual, and unattended by high febrile reaction. Indeed, the more wide experience we have ourselves had in the treatment of this disease since the publication of the last edition of this work, has convinced us that bloodletting is, to say the least, unnecessary, excepting perhaps in cases where the disease occurs suddenly in vigorous childr and is attended at an early period of the attack by violent febrile act and marked suffocative symptoms. Under such circumstances, and s only, it may be advisable to resort to a moderate general venesecti principally for the mechanical relief thus afforded to the acute and tense venous stasis caused by the obstructed respiration.

For all the other indications, however, for which bleeding was forme recommended in croup, namely, for the reduction of the fever and infla mation, and for the arrest of the exudative process, we prefer resorti to the other remedies hereafter mentioned.

*Emetics.*—Emetics are recommended by all writers, and are genera acknowledged to be amongst the most, if not the most, efficient of all th means employed. M. Valleix (*op. cit.*, t. i, p. 358) has demonstrated th importance more fully than any other writer. He states that of fifty-thr cases of the disease, tartar emetic and ipecacuanha were chiefly relied o in thirty-one, of which fifteen were cured; whilst of the twenty-two others in which they were parsimoniously given, but a single one recovered. H gives other facts in regard to these cases which are highly interesting an important. Thus, of the thirty-one cases treated with powerful emetic false membrane was rejected during the efforts of vomiting in twenty six; and of these, fifteen, or nearly three-fifths, recovered. In the fiv others of the thirty-one, on the contrary, no membrane was expelled, an they all terminated fatally. Again, of the twenty-two cases in whic emetics formed but a secondary part of the treatment, two rejected fals membrane, and of these one recovered; while of the twenty others i which no false membrane was expelled, not one escaped.

Our own experience in regard to emetics has been as follows: The were administered frequently and in full doses in thirteen of the twenty one cases which began with angina; in six they were employed to a mo erate extent, and in two not at all. Of the thirteen cases in which the were freely administered, eleven recovered; but, as in one of these lif was saved only by tracheotomy, the success cannot be attributed to th emetics. Of the eight cases in which the emetic plan was not pushed, a but one ended fatally. False membrane was rejected in eight out of th thirteen cases above referred to. In one of the eight cases the quantit rejected was very small, and this was the case in which the child was ult mately saved only by the operation.

Of thirteen cases in which the disease began in the larynx, emetic were energetically used, and frequently employed, in eight. Of the eigh five recovered. In four of the eight cases, fragments of false membran were rejected, and in a fifth, a mass of viscid, yellowish fibrin (this cas was marked as one of unquestionable membranous croup by remaining two cases they were not employed at all. Tracheotomy was performed in four of these five cases, but in only one was a successful result obtained.

It is indeed true that there were peculiarities about the age and the type of the disease in the above groups of cases which may modify to some extent the conclusions which seem inevitable; but the statements and facts above given are quite sufficient to show that emetics exert a most powerful and beneficial influence on the disease, and that they ought, therefore, to form a principal and essential part of the treatment.

The emetics generally employed in Europe and this country are tartar emetic and ipecacuanha, which are given in the usual doses to produce full vomiting. We would, however, strongly discountenance the employment of tartar emetic as an emetic, under any circumstances, in children; and, at least in the disease under consideration, we do not like ipecacuanha as an emetic so well as one which, so far as we know, was first recommended by the late Dr. Charles D. Meigs. We refer to the Alumen of the Pharmacopœia.

In an article published by Dr. Charles D. Meigs in the *Medical Examiner* (vol. i, p. 414, 1838), he says he has been "accustomed to make use of an emetic, which, so far as I can learn, is very little employed, but which, from the certainty and the speediness of its operation, ought to be more generally admitted into the list of available medicines for this particular case at least. I have been familiar with its effects for more than twenty years, and my confidence in them increases rather than diminishes by time." He adds, "I think that I have never given more than two doses without causing very full vomiting; but I have often given large quantities of antimonial wine and ipecacuanha, without succeeding in exciting the efforts of the stomach."

The alum is given in powder, in the dose of a teaspoonful, mixed in honey or syrup, or in syrup of ipecacuanha, to be repeated every ten or fifteen minutes until it operates. It is not generally necessary to give a second dose, as one operates in the majority of cases very soon after being taken. We have known it to fail to produce vomiting only in two instances, both of which were fatal cases. In one the disease had gone so far before we were called, that no remedy had any effect upon the stomach. In the other, it was administered several times with full success, but lost its effect at last, as had happened also in regard to antimony and ipecacuanha. The reasons for which we prefer alum to antimony, or ipecacuanha alone, are the following: Antimony, when resorted to as frequently in the disease as we are of opinion that emetics ought to be, is too violent in its action; it prostrates many children to a dangerous degree, and is, we fear, in some cases, itself one cause of death. It acts injuriously upon the gastro-intestinal mucous membrane when used in large quantities and for any considerable length of time. Again, it is very apt to lose its effect, and to fail to produce sickness. Ipecacuanha is a much safer remedy than tartar emetic, but its operation is often too mild, and it not unfrequently fails to produce any effect after it has been used several times. The advantages of the alum are that it is certain and rapid in its action, and that it operates without producing exhaustion or prostration beyond that which always follows the mere act of vomiting. It does not tend like antimony, and in a less degree ipecacuanha, to produce adynamia of the nervous system; an effect which, in some constitutions and states of the constitution, or when it has been exhibited frequently, is often attended with injurious or even dangerous consequences. We have given alum in the dose above-mentioned every four or five hours, for two and three days, without observing any bad effects to result from it. The alum was given in all the cases that we have seen, in which emetics were used, and was usually the only one employed when it was found to produce full vomiting. In one of the cases accompanied by violent angina, ipecacuanha was substituted because of its smaller bulk. We have already said that it failed to produce vomiting only in two instances. It was the emetic employed in the nine cases in which fragments of false membrane were rejected, and in that in which the yellow viscid fibrin was expelled. Although it did not occasion the rejection of membrane in the other cases, it operated most speedily and efficiently.

Sulphate of copper has been highly recommended by several writers for its emetic operation, and, by some of the German physicians, as exerting a specific influence upon the disease in addition to its emetic effect. As an emetic, it may be given to a child two or three years old, in the dose of from half a grain to a grain every fifteen minutes, until it operates. To obtain its specific action it is continued afterwards in doses of a quarter of a grain every two hours.

We have also employed, with very good results, sulphate of zinc dissolved in syrup of ipecacuanha, in the proportion of 2 or 4 grains to the fluidounce. Of this, a teaspoonful may be given to a child two or three years old, and repeated every fifteen minutes until it operates. This combination appears, like that of alum and ipecacuanha, to possess the double advantage of mild action without the production of any subsequent depression.

We conclude these protracted remarks upon emetics with the statement, that from what we have read, and from personal experience, we are induced to regard them as the most important remedies we have to oppose to this fearful malady. The emetic, whatever it may be, ought to be given three or four times in the twenty-four hours, and in severe cases, once in every four or five hours. The exact periods, and frequency of the administration, must be determined by the stage and urgency of the symptoms, and by the constitution and present strength of the patient.

*Mercury.*—This powerful drug was first employed freely in the treatment of membranous croup by American physicians, and has subsequently been extensively used by English and European physicians. Calomel is the preparation almost always preferred, and many authors still recommend the administration of this remedy, in larger or smaller doses, in the earliest stage of the attack.

Since the publication of the last edition of this work, our increased dislike of the administration of mercury to children in large and frequently repeated doses, and the constant observation that even its free use does not appear to arrest the course of true croup, or prevent the formation of membranous exudation, have led us to abandon entirely its employment in this disease.

At the same time we believe there has been found, in the free administration of the alkalies, an agency far less injurious than mercury, and equally powerful, if not more so, in promoting the separation and discharge of the exudation, and preventing its reproduction.

The internal remedies, then, upon which, after emetics, we rely most surely, are various alkaline, salts, the use of which in large doses has been of late years highly recommended, both at home and abroad. Those which we are most in the habit of employing are the chlorate and citrate of potash, which should be given in full and frequently repeated doses, as, for example, two or three grains every two hours to a child of four years old. We are also in the habit of combining with the chlorate of potash, tincture of the chloride of iron, in doses of three to five drops, at the same age.

*Antispasmodics* are undoubtedly useful in some cases, when there is much laryngeal spasm.

*Opium* is, however, the best remedy that can be employed for this condition, since it constitutes an important element in the treatment, by alleviating pain and restlessness, at the same time that it relieves the laryngismus, and thus diminishes the asphyctic symptoms. We would consequently recommend the use of some of the preparations of opium, as the tinct. opii deodorata, in such doses and at such intervals as will maintain a gentle opiate impression. In this, as in many other diseases of children, it is better not to prescribe the opium in combination with the other remedies that may be administered, but to either give it separately, or, better still, to add it to the dose of the other medicines at the time of administration, so that the amount of the dose of opium and the frequency of its repetition may be modified constantly in accordance with the condition of the child.

*Revulsives* often prove useful in allaying restlessness, and moderating the violence of the suffocative attacks. Sinapisms and mustard poultices, applied upon various parts of the cutaneous surface, and mustard footbaths, are amongst the best. The warm bath is often highly beneficial in the same way.

We do not think it desirable ever to employ blisters in this disease.

LOCAL TREATMENT.—In those cases, and, as we have seen, they constitute the large majority of all cases of true croup, where the exudation appears in the fauces or on the tonsils before it involves the larynx, local applications to the throat are undoubtedly of importance.

The objects of such applications are here, as in diphtheritic angina, to promote the separation of the false membrane, and to prevent its reproduction. To fulfil the first of these indications, many authorities recommend astringent and caustic applications, which cause the pseudomembrane to contract and shrink, and thus tend to promote its separation; while others direct the use of those agents which exert a solvent action upon the exudation.

In the former class the most advisable are, alum; tannic acid; solution of nitrate of silver; the astringent salts of iron, especially the tincture of the chloride and the perchloride; dilute mineral acids and carbolic acid.

Of these applications, those which we prefer are a solution of nitrate of silver, in the proportion of 5 to 20 grains to f℥j of distilled water, and tincture of the chloride of iron, in the proportion of fʒss to f℥ij, or the f℥j of water.

The second group comprises chiefly solutions of various salines, as the carbonate of potash, bicarbonate of soda, chlorate of potash; and lime-water.

If any of the astringent or caustic solutions are employed, we would recommend their application only to the patches of exudation in the fauces, since we regard it as highly doubtful whether they actually possess the power of preventing the formation of membranous exudation when applied to the surrounding mucous membrane. Still more should we doubt the efficacy or advantage of introducing such solutions, and especially the more powerful ones, into the larynx; either by pressing a soft sponge saturated with the solution upon the chink of the glottis, or by passing the sponge directly into the cavity of the larynx, as recommended by Dr. Horace Green. (*Observ. on the Path. of Croup, &c.*, New York, 1852.) The practicability of this proceeding is undoubted, and a certain number of cases are on record, in which it seems to have been used with success; but we have never resorted to the treatment ourselves.

In cases occurring in older children, who can be induced to inhale the vapor from an atomizer or to allow a hand-ball atomizer to be used, the various astringent and solvent solutions above-mentioned can be applied most satisfactorily in this manner; and, when this is practicable, we would prefer the use of lime-water or one of the alkaline solutions.

In order to obtain the advantage which undoubtedly follows the inhalation merely of the watery vapor, we are in the habit of causing the child to inhale the vapor from slaking lime for a few minutes in every hour, by covering the patient's body with a thick cloth, and holding a vessel containing the slaking lime a short distance below his mouth under the covering. It is doubtful, however, whether any appreciable amount of lime is carried up by the vapor so as to give the additional advantage of its solvent action upon the exudation.

The reader is referred for more detailed discussion of this question of local applications in the treatment of croup, to the remarks upon treatment in the article on diphtheria.

HYGIENIC TREATMENT.—The child ought to be warmly clothed and confined to bed. The temperature of the room should be kept equable, and about 70° F.; the air should also be frequently changed, so as to preserve it constantly pure and fresh.

Owing to the loss of appetite and the pain caused by deglutition, it is often very difficult to induce the little patients to take food, so that this important element in the management of the case requires the utmost tact and attention. During the early part of the attack, the food should consist of light animal broths, beef tea, and preparations of milk. Later in the case, when the violence of the febrile action subsides, or if any symptoms of exhaustion and prostration appear, a small amount of wine and water, of wine whey, or of weak milk punch, should be given.

Ice, given in small pieces, to be held in the mouth, should be used very freely, as it relieves the parching thirst and at the same time appears to act favorably upon the inflamed mucous membrane.

Summary of the Treatment.—The general plan of treating this disease should, therefore, in our opinion, be somewhat as follows: The child should be confined strictly to bed. The food should be light, digestible, but nourishing, and, upon the earliest approach of exhaustion, a stimulus should be administered. In the early part of the attack, we should advise the use of revulsives, with mild counter-irritants; topical applications to the fauces if there is any membranous exudation visible, and the internal administration of citrate of potash, with ipecac and small doses of opium, or of chlorate of potash with tr. ferri chloridi. So soon as the symptoms positively indicate the presence of false membrane in the larynx, we should resort to emetics, as directed in our remarks upon those remedies. And finally, after employing these means faithfully but without securing the discharge of the false membrane, while, on the other hand, the symptoms of laryngeal obstruction steadily progress, and the respiration grows more and more difficult, we must consider the propriety of resorting to the operation of tracheotomy, a proceeding which, as will be seen from the ensuing remarks, we approve of under the above circumstances.

Tracheotomy.—The operation of tracheotomy would be apt to suggest itself to a medical man, on his witnessing the closing symptoms of croup, as the very means most likely to afford to the patient relief from the dreadful sufferings under which he labors, and as a possible rescue from impending death. It has accordingly been often resorted to in different parts of the world, at various stages of the disease, but with results that have led to very different conclusions.

In England, for example, the operation was almost universally condemned and abandoned about ten years ago; and in the preceding edition of this work, we presented the unfavorable opinions of the most eminent English authorities.

It was a matter of very great surprise, at that time, that the results of the operation in the hands of English surgeons should differ so widely from those obtained by the French physicians in similar cases. And, as there was no good ground for believing that sufficient difference existed between the croup of Paris and London, to explain the difference of success in the two cities, it is probable that the great disparity resulted, in part, from the operation being performed in France at an earlier stage of the disease, and in part also from the more careful after-treatment which the patients received.

Within the past few years, however, the operation has been more favorably regarded by English surgeons, and the statistics published show that the proportion of success now obtained does not fall far short of that claimed by French operators.

Thus in a paper read before the Royal Med. Chir. Soc., in 1857, by Dr.

Fuller, it is stated that up to that time 22 cases of tracheotomy in croup had been recorded in England, and that life had been saved in 8 of these, or in 1 out of every $2\frac{3}{4}$ cases.

In the statistical report of English Hospitals from 1854–59, it appears that the operation had been performed in 15 cases with 4 recoveries, or 1 in every $3\frac{3}{4}$ cases. Still further, from the statistics published by individual operators in England, since 1858, though it is not to be presumed that we have met with all the cases recorded, it appears that tracheotomy has been resorted to in 63 cases, with successful results in 24, showing a success of 1 in $2\frac{5}{8}$.

When it is borne in mind also, that in each of these instances the operation was postponed to the last suffocative stage, and that, without exception, the operators believe that the proportion of success would have been increased by its somewhat earlier performance, it becomes evident that tracheotomy has acquired a fair position in England among the legitimate operations of surgery.

It is thus advocated by Fergusson in the last edition of his *Practical Surgery:* and Dr. West, in 1859, speaks of it in these terms: "In spite of the unfavorable issue of the few cases in which I have either directed or sanctioned the performance of tracheotomy in croup, I am so far from being opposed to the operation, that my chief anxiety is to make out the indications which may justify me in having more timely recourse to it in future."

In Germany, also, the operation, if not generally practised, is regarded as fully justifiable, and recommended and successfully performed by many of the most eminent authorities.

The statistics of the results there obtained, borrowed from Fock[1] and Voss,[2] show that of 50 cases operated on in the last stage, 24 terminated favorably, giving a success of 1 in $2\frac{1}{12}$, or 48 per cent. Steiner has also recently published (*Jahrb. f. Kinderheilk.*, No. 1, 1868) the results of the operation in 52 cases (33 boys and 19 girls), which show a recovery of 18, or 34.6 per cent. of those operated upon; and in an article upon diphtheria and tracheotomy by Güterbock (*Arch. d. Heilkunde*, 1867, No. 6) 100 cases operated on in Berlin are reported, with 33 cures.

It is, however, in France that the operation first obtained, and has since firmly held, the position of a proper and legitimate method of treatment under certain circumstances of the disease. M. Bretonneau, of Tours, was the first who practised it with sufficient success in France to give it some vogue. Since that time, it has been recommended and performed by many different surgeons and physicians in that country, and particularly, as is well known, by M. Trousseau, who has been, undoubtedly, the most ardent and persevering, as well as the most experienced advocate of the operation. In one of his later publications upon this subject (*Arch. Gen. de Med.*, Mars, 1855, p. 259), he thus boldly advocates it: "For my part, I am quite determined not to allow myself to be discouraged, but to preach tracheotomy with the greater conviction in proportion as its success increases, and did this proportion remain what it was ten years since, I should still proclaim the necessity of the operation, nor cease to say that it becomes *a duty*, a duty as imperative as the ligature of the carotid artery after a wound of that vessel, though death follows the operation as often, certainly, as recovery.

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[1] Report on Tracheotomy. Brit. and For. Med. Chir. Rev., July, 1860, from Deutsche Klinik, 1860.

[2] New York Journal of Medicine, January, 1860.

M. Guersent (*Dict. de Med.*, t. ix, p. 376) recommends the operation when the usual therapeutical methods have failed, "as the only means that offers a remaining chance." He adds (p. 377) that he is certain it does not add to the danger of the disease. MM. Rilliet and Barthez (*Mal. des Enfants*, 2ème ed., t. i, p. 337) say that, "The utility of tracheotomy in the treatment of croup cannot at this day be denied; numerous cases of children snatched from a certain and imminent death, reply victoriously to any doubts that may be raised as to the truth of this assertion." The authors of the *Comp. de Med. Prat.* (t. ii, p. 587) remark that of late years, "the successful operations have been numerous enough to dispel the unfortunate prejudices which tracheotomy has hitherto inspired." M. Valleix (*Guide du Méd. Prat.*, t. i, p. 388) says that the number of recoveries are "now too numerous to allow any one to think of opposing the operation except by statistics." MM. Hardy and Behier (*Trait. de Path. Int.*, 1850, t. ii, p. 496) in speaking of the contest in regard to the propriety of the operation, say: "But the question seems now to be definitely settled; the operation has succeeded in fact in a little more than one-fourth of the cases in which it has been performed, and, in presence of these results, it may be said to become the duty of the physician to have recourse to it, whenever, notwithstanding an appropriate treatment, the general and local symptoms indicate the extension of the false membrane."

M. Bouchut (*Trait. des Mal. des Nouv.-nés*, 2ème ed. p. 316) says, that when medical means have failed, and the disease has produced a "state tending towards asphyxia, in which an attack of suffocation might cause the death of the child, there should be no hesitation; a new route must be artificially opened to the external air; tracheotomy must be performed."

At the time most of the above expressions were written, a comparatively small number of operations had been placed upon record in France, but they were quite sufficiently numerous to show conclusively that, if the operation were carefully performed, and the after-treatment skilfully conducted, from 25 to 33 per cent. of the cases would recover. This excellent result is to be in great part attributed to the improvements introduced by Trousseau, and subsequently by other operators, both in the mode of performing the operation, and in the after-treatment of the cases.

Since the publication of the last edition of this work the operation has continued to be so frequently performed in France, that we can not find space to quote the results obtained by individual operators. The aggregate of their reports, however, as collected by Roger and Seé, Chaillou, Barthez, &c., yield a result of about one recovery in four in a series of over 500 cases.

The proportion of recoveries has varied considerably in different years in accordance with the type of the epidemic; in some years, as 1858, fal ing as low as 1 in 6.9 (124 operations, and but 18 recoveries), while i other years it has risen even higher than 1 in 3.

It is further to be remembered, that these French statistics are alm exclusively derived from the reports of the Hôpital des Enfants, in Paris and refer, therefore, to a poor class of patients, who have in many stances been subjected to improper and debilitating treatment befo reaching the hospital, and who are exposed to unfavorable hygienic c ditions while in the institution. When these unfavorable circumstanc are allowed their full weight, it must be conceded that the operation tracheotomy has achieved a considerable share of success in France, an has fully justified the eloquent and enthusiastic advocacy of Trousse

In America, tracheotomy has been resorted to but rarely until withi the past few years. The statistics which have been lately publishe however, fully suffice to show that, in the hands of American physician it has been very nearly, if not altogether, as successful as it has abroa Dr. H. H. Smith (*Oper. Surg.*, 2d ed., vol. i, p. 473) gives the results 26 operations performed in this country, of which 9 recovered. Dr. G (*Boston Med. and Surg. Jour.*, Jan. 27, 1859, et al.) reports 13 operation with 7 cures and 6 deaths; and other operators in Boston have perform the operation in all 15 times, with 7 cures and 8 deaths. But by far t most extensive statistics have recently been published by Dr. A. Jacob of New York (*Amer. Jour. of Obstet.*, May, 1868, pp. 13 to 65), derive exclusively from the practice of physicians in that city.

The following table shows the results obtained:

| Operator. | No. of cases. | No. of cures. | Percentage of success. |
|---|---|---|---|
| Jacobi, | 67 | 13 | 19½ |
| L. Voss, | 43 | 10 | 23⅓ |
| E. Krackowizer, | 55 | 16 | 29 |
| W. Von Roth, | 48 | 11 | 23 |
| Total, | 213 | 50 | 23½ |

In this city the operation has been as yet but seldom resorted to, an with but moderate success, owing to the fact, that in nearly every instanc it has been postponed until the child was almost moribund. The follo ing table embraces certainly the great majority of the operations th have been performed; for a knowledge of which we are to a great exte indebted to the courtesy of the operators, since but few of them have yet been placed on record:

| Name of operator. | Number of cases. | Number of cures. |
|---|---|---|
| Physick, | 2 | 0 |
| Goddard, | 2 | 0 |
| Page, | 1 | 0 |
| J. Pancoast, | 6 | 3 |
| R. J. Levis, | 11 | 1 |
| T. H. Bache, | 1 | 0 |
| A. Hewson, | 1 | 0 |
| H. Lenox Hodge, | 3 | 2 |
| J. H. Packard, | 1 | 0 |
| Total, | 28 | 6 or 21.4 per cent. |

Finally, to sum up the statistics given above, although even this aggregate does not include by any means all recorded cases, Jacobi states (*loc. cit.*), that out of 1024 operations of tracheotomy, performed in various parts of the world, but principally in Europe, 220 or 21.48 per cent. recovered.

It is evident, therefore, that wherever this operation has been practised in true croup, a considerable proportion of cures has been effected; but in order to form a clear opinion as to the real merits of the operation, it is necessary to have some idea as to the number of subjects that might have recovered without a resort to it.

This is very easily arrived at in this country, since we believe that it is never performed here except as a last resort, when the patient is manifestly in great danger of death, or absolutely moribund.

In regard to the French operations, it is not so clear whether some of the patients, who recovered after the operation, might not have been so fortunate without it, particularly as M. Trousseau formerly recommended that it should be performed so soon as we can be certain that the larynx contains false membranes. But then it is generally understood that he was not called to many of the cases upon which he operated until all other means had failed, and the child had fallen into an apparently hopeless condition. To elucidate this matter, we shall quote the statements made by M. Valleix, one of the most accurate and impartial of writers. M. Valleix (*loc. cit.*, p. 388–9) tells us that he collected together 54 cases of undeniable, well-marked true croup, treated without the operation, and found that 17 had been cured. Then, examining what had occurred in regard to the operation, he found, as M. Bricheteau had done before, that nearly 1 in 3 had recovered, a success almost precisely the same as had taken place in the cases treated by medical means alone. "But," he goes on to remark, "there is a consideration of very great importance, one which gives an altogether different value to tracheotomy, to wit, that in the immense majority of instances, the operation was performed under the most discouraging circumstances, and only when all other methods of treatment had proved useless, and the severity of the symptoms, and the near approach of asphyxia, indicated impending death. . . . . So that it follows that tracheotomy should be regarded, in connection with croup, as a genuine medical victory, the honor of which belongs to M. Bretonneau, and all preconceived views should fall before the actual facts." We have here the evidence of a most competent witness, living on the spot, to convince us that the operation is not resorted to in France, at least generally, early in the disease, but is performed only as a last resource, when the chance for the patient from the efforts of nature, or from medical means, is almost null. How, then, can we resist the conviction that tracheotomy does afford a sufficient probability of success, after other means have failed and death is fast approaching, to render a recourse to it at least justifiable, if not almost compulsory?

The second point to be examined in discussing the propriety of the operation is, whether it be in itself dangerous.

From the opinions expressed by authors upon this subject, it appears that the only serious danger attendant upon the operation is the occurrence of hemorrhage. When performed for the removal of foreign bodies from the air-passages, the patients almost always recover if the foreign body do but escape. M. Ollivier (Art. *Larynx*, *Corps Etrangers*, *Dict. de Méd.*) says that the success of the operation is, so to speak, certain when it is performed early. Liston disapproves of the operation in croup, but states that it is not attended with much danger. Skey regards it as an operation of some difficulty and danger, from the irregularity in the distribution of the vessels, and the existence of numerous veins which may bleed profusely. M. Boyer does not regard it as dangerous, and states that the only danger is from the occurrence of venous hemorrhage into the trachea, and not from the amount of blood lost. Chelius says that it is dangerous below the cricoid cartilage from anastomosis of the thyroidean arteries, from the presence of venous plexuses, and sometimes from a deep thyroidean artery. Velpeau speaks of the venous hemorrhage as alone dangerous. Trousseau states that he has performed it more than 200 times, and has met with but a single fatal accident in of these. Dr. Pancoast, of this city, who has operated in more than cases of croup, and a number of times for the removal of foreign bodies in the air-passages, has never met with any serious difficulty in the performance of the operation, nor with any accident which he could suppose might have affected the life of the patient. Dr. H. H. Smith (*op. cit.*, p. 474), when commenting upon the great disparity of the mortality after tracheotomy, when performed for removal of foreign bodies, and when for the relief of croup, remarks that it is very evident that the dangers which ensue upon incising a healthy trachea are comparatively slight, and that the great mortality which has attended the operation when performed for the relief of croup, must be due to some other cause than the mere incision of the windpipe.

If, then, it is the uniform testimony of those experienced in the matte that the operation is in itself alone but slightly dangerous to life, so tha its performance adds but little to the danger of the patient; if it afford immediate relief to the suffocation which threatens to be soon fatal, an at least gives additional time, during which the gravity of the diseas may subside; if, further, as we think has been most conclusively show by the statistics quoted, it has unquestionably saved the lives of a considerable number of those upon whom it has been performed, it is difficult to avoid the conclusion that it is our imperative duty to resort to th operation under certain circumstances.

That some who have been operated upon might have recovered withou it, is highly probable; but the uncertainty as to the absolute necessity resorting to it in any individual case is not even so great, probabl operation to them, setting before them the great probability of its not averting death, but still strongly pointing out the fact that it does not add to the danger of the case, but gives so much additional chance for life that about 1 in every 4 operated upon recovers.

Should they throw the whole responsibility upon us, we should, without hesitation, advise the operation. Our grounds for so doing are very simple, and have been before indicated. The operation does assuredly frequently save life. It is not in itself attended with any great danger. It cannot increase the danger of the patient's position, but certainly gives an additional chance of escape from the disease; and, lastly, it mitigates, in a remarkable manner, the sufferings of the patient. On several occasions, indeed, we have been told by the parents, after the death of their child, that they were very glad it had been performed, since, at all events, it had removed the frightful gaspings and strugglings for breath which had previously convulsed the whole frame of the poor little sufferer, and had rendered his last hours easy and tranquil.

If we decide that tracheotomy is justifiable, it becomes all-important to determine the period of the disease at which we should have recourse to it.

M. Trousseau formerly laid down the rule that it was to be performed so soon as it was certain that false membranes had formed in the larynx. He fixed upon this as the proper moment, because he believed that death was, under these circumstances, almost inevitable.

This opinion is, however, readily proved to be untenable. We have already learned from M. Valleix that of 54 perfectly well-marked cases collected by himself, treated medically (without the operation), 17, or about a third, recovered. If we add to this that, of 35 cases seen by ourselves, 15 recovered without the operation, it becomes very clear that the mere presence of the exudation in the larynx is not sufficient warrant for a resort to the operation.

Accordingly, most authorities advise that we should wait until medical means have been fairly tried. Thus, MM. Rilliet and Barthez (*op. cit.*, t. i, p. 340), in discussing the period at which the operation ought to be performed, conclude that it should not be resorted to until the means that have succeeded in other cases have been fairly tried, and it has become evident that they must fail. They advise the practitioner not to wait, however, too long a time, but to operate even early should the patient suffer a paroxysm of suffocation so severe as to make it probable that another might prove fatal. So, too, Mr. James Spence, in a valuable paper on tracheotomy (*Edin. Med. Jour.*, Feb., 1860), states, as the result of his large experience, "that if, in a case of croup, all measures have been actively tried, if the hard, ringing cough has become suppressed, and the respiration is evidently imperfect, as shown by the contracted and depressed appearance of the cartilages of the ribs, and the occasional severe paroxysms of dyspnœa, the operation is fully warranted. When the paroxysms become more and more frequent, and when the dyspnœa is rather persistent than paroxysmal, with turgid or pale lividity, the operation is the little sufferer's only chance for life."

cover without the operation.

When, however, despite the use of all medical means, and especially the repeated administration of emetics, the dyspnœa grows steadily and progressively greater; when there is marked hissing laryngeal stridor, and, at each inspiratory effort, recession of the base of the thorax; when, in addition, the voice is whispering or suppressed, and the cough short, smothered, and muffled, the operation should, we think, be unhesitatingly performed.

In thus defining the conditions under which tracheotomy is called for in croup, it is clear that we are not to be influenced at all by the mer period of the disease as measured by time, but that, whenever the abov symptoms are present, the operation is indicated.

There can be no doubt, however, of the far greater success of the operation when performed in the early period of the attack, before the patient' strength is materially impaired; and it is, therefore, highly desirable tha the indications which render its performance necessary should be appreciated so soon as they appear.

Thus Trousseau, in his last publication upon this subject (*Clin. Méd* 2ème ed., t. i, p. 450) speaks as follows: "I wrote in 1834, and repeate in 1851: so long as tracheotomy was not a trusty weapon in my hands I said: we should operate as late as possible; but now that I can numbe many successes, I say, we should operate as early as possible. In removing from this assertion whatever may seem too absolute, I still affirm it, by saying, that *the chances of the success of the operation are so muc the greater in proportion as it has been the earlier performed.*"

Notwithstanding this, however, should we be called to a case wher the last stage of asphyxia has been reached, it is still not too late to perform the operation. Thus, in one of the cases that occurred in our ow practice and which ended favorably, this condition was fully develope and the bluish skin, drowsiness and insensibility to pain, showed tha the patient had already sunk into very advanced asphyxia.

Perhaps we cannot do better in closing our remarks upon this poin than to quote the concise and forcible axiom laid down by all cases occurring under the age of two years. It is unquestionably true, as might be expected, that age exercises a most powerful influence upon the prognosis after the operation, owing partly to the difficulty in performing it on account of the narrowness of the trachea and the shortness of the neck, but chiefly to the deficiency of vital power, and to the difficulty of nourishing the infant afterwards. Notwithstanding these influences which render the prognosis so unfavorable in tracheotomy before the age of two years, there are so many successful cases on record that the most tender age can no longer be regarded as a positive contraindication. The following list embraces the names of the operators and the age of the infants in the cases which have been successful at a very early age:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Baizeau, . . . | at | 10 | months. | Vigla, . . . | at | 17 | months. |
| " . . . . | " | 15 | " | Potain, . . . | " | 18 | " |
| " (in hands of his colleague), | " | 15 | " | Moutard-Martin, . | " | 18 | " |
| Isambert, . . | " | 16 | " | Trousseau, . . | " | 13 | " |
| Archambault, . . | " | 13 | " | Barthez, . . . | " | 13 | " |
| " . . | " | 18 | " | " . . . . | " | 7 | " |
| Roger, . . . | " | 19 | " | Maslieurat Lagemand, | " | 23 | " |

In adults, on the other hand, tracheotomy in croup is less successful than in children, probably because, as Trousseau suggests, the form and size of the larynx allows the pseudo-membrane to extend deeply into the bronchia before producing the symptoms of croup.

There is another condition which, it is thought by many, ought to constitute an insuperable bar to the operation, and the possible existence of which, in any case, is one of the most serious objections that has been brought against its performance. The condition to which we allude is the presence of pseudo-membranous exudation in the bronchia.

The existence of this condition must greatly lessen the chances of a successful operation, but that it renders success impossible, as has been supposed, cannot be admitted. MM. Rilliet and Barthez (*op. cit.*, 2ème ed., t. i, p. 338) says: "It has been said that one contraindication was the presence of false membrane in the bronchia. But, besides the fact that the symptoms denoting its presence are uncertain, we cannot see in this a positive objection to the operation. Recovery has been known to occur, in effect, after the rejection of bronchial false membranes, and we were ourselves witnesses of a remarkable example of this kind. And is there any better mode of facilitating the escape of foreign bodies than by opening to them a passage below the larynx? Under such circumstances, we must expect, to be sure, a greater mortality than under more favorable conditions. This opinion is, moreover, that of M. Bretonneau." Numerous cases are indeed on record, and we have ourselves met with such, where, after the operation, large membranous casts of the trachea and bronchia, which could certainly never have escaped through the larynx, have been discharged through the tracheal opening, and their escape followed by complete recovery.

It appears evident, therefore, that if in such cases, when death is even more surely imminent than in those instances when the exudation does not extend below the larynx, tracheotomy affords even a very slight additional chance of recovery, it should be performed despite the fact that the child will in all probability die.

But apart from this consideration, it must be borne in mind that statistics prove that the false membrane extends below the larynx in about one-third of all cases, and still further, that there are no means by which we can with certainty determine in any individual case whether such extension has taken place or not.

It was at one time thought that auscultation might afford the desired information, but more careful observation has shown that it is not to be depended upon. As already said, in most cases the laryngeal stridor is so loud as to mask all chest-sounds, and, even when this does not happen, we have frequently observed that no definite and reliable information is to be gained from physical examination. The following cases may be quoted, out of the number on record, besides several that we have ourselves seen, as proving this statement. MM. De La Berge and Monneret (*Comp. de Méd. Prat.*, t. ii, p. 587), mention a case in which they could not believe that the bronchia contained false membranes, as the vesicular murmur was extremely pure and was heard everywhere; and yet, during the operation, a false membrane was drawn out, which represented the trachea and the division of the principal bronchia. The child died in 15 hours.

The late Prof. William Pepper, of this city, reported 2 fatal cases (*Summary of Trans. Coll. Phys.*, vol. iii, No. iii, p. 106) in one of which "distinct vesicular murmur could be heard throughout the lungs, marked only occasionally by sibilant and sonorous râles," a few hours before tracheotomy was performed. The child died 20 hours after the operation, and the exudation was found to implicate the larynx, trachea, the large bronchia, and even some of the smaller ramifications. In the other case, the state of the respiration was carefully examined the day before death, and not the least respiratory murmur could be heard over any part of the chest, and yet in this instance, the exudation was confined strictly to the larynx; not a vestige of false membrane was to be found either in the trachea or bronchia.

In a case recently attended by us, where tracheotomy had been performed, so that all laryngeal stridor was absent, auscultation, eight hours before death, revealed quite strong respiratory murmur, much obscured by snoring bronchial râles. The antero-lateral parts of the chest were alone ausculted. Death occurred somewhat suddenly from the lodgement of a very large tubular membrane from the left bronchus in the trachea: and at the autopsy there was a tubular membrane found extending throughout the trachea, and through the right bronchus to its third divisions. The left lung was collapsed and congested; the right one distended and emphysematous.

Since, then, we can learn little or nothing from auscultation or any other means, as to the presence of false membrane in the bronchia, the question becomes one of expediency, so far as this contraindication is concerned, whether to leave two-thirds of the patients, many of whom could certainly be saved by the operation, to perish without an effort to save them, because one-third *must* probably die; or to perform the operation, with very little prospect of success in one-third, for the sake of the chance of saving many of the remaining two-thirds who must otherwise perish.

The presence of pneumonia is also universally recognized as greatly lessening the chances of recovery after tracheotomy. It must be borne in mind, in regard to this point, that pneumonia is frequently overlooked, and indeed that it frequently cannot be recognized on account of the loud tracheal râles which hide all auscultatory sounds: while, on the other hand, its presence may be simulated by the occurrence of collapse of some portion of the lung, owing to occlusion of the bronchus leading to it. Millard suggests that the degree of dyspnœa may be of service as indicating the presence or absence of pneumonic complication. Thus he has found that in croup not thus complicated, the rate of respiration is from 32 to 48, while when pneumonia is present, it rises above 50. Pneumonia of one lung is not, according to Guersent, a contraindication, nor is even double pneumonia regarded by some operators as absolutely interdicting the operation, though at the same time we are not aware of a single instance in which it has been successfully performed where this condition was unquestionably present.

Another condition in which tracheotomy is thought by many to be contraindicated, is when membranous croup occurs as a secondary affection, during the course of some constitutional disease other than diphtheria, as for instance, scarlatina, measles, or pertussis. Such cases were regarded even by Trousseau, as absolutely unfit for operative treatment. Still, that this contraindication, although of the greatest weight, does not entirely forbid tracheotomy, is shown by a case of croup following scarlatina, in which Dr. Voss operated, and the child survived 31 days, the tracheal wound being nearly closed. Millard also, in his excellent essay on tracheotomy (*De la Trachéotomie dans le Cas de Croup*, Paris, 1858), records 3 cases of croup secondary to measles, successfully treated by operation. He regards croup occurring in the course of pertussis as far less unfavorable, since the violent cough favors the expectoration of the false membranes.

There remains, finally, one condition to be indicated in which the operation is, in the almost unanimous opinion of authorities upon this question, absolutely contraindicated. We refer to the cases of profound general diphtheritic infection, where the danger of the child depends upon the constitutional disease, even more than upon the laryngeal obstruction, where the blood is gravely altered, and the well-known tendency exists to the formation of pseudo-membranes upon all abrasions or wounds, so that in all probability the operation would merely serve to invite the extension of the exudation.

Trousseau opposes the operation under such conditions, in the following words: "If the diphtheritic infection have profoundly attacked the constitution, if the skin, and especially the nasal passages are occupied by the specific inflammation, if a frequent pulse, delirium, and prostration show the system to be deeply poisoned, and if the danger is rather from the general condition than from the local lesion of the larynx and trachea *the operation ought never to be attempted*, for it is invariably followed by death."

Even under this most unfavorable of all conditions, however, there are not wanting some operators of wide experience, who still recommend the operation: thus Jacobi (*loc. cit.*) asserts, that whenever the indication of suffocative dyspnœa, steadily increasing and not relieved by emetics, exists, he would operate despite any complications, general diphtheria or anything else, and uses this powerful language: "Seeing a person suspended by the neck and being strangled, we should hardly investigate the propriety of cutting the rope from the point of view that the sufferer might be or is affected at the same time with tuberculosis, cancer, or diabetes."

After a careful review of the entire question, we believe that the facts upon record justify the following conclusions: that the condition of success which excels all others is the predominance of the characters of asphyxia; that when these are so marked that death is imminent, the operation is justifiable despite any complications which may coexist, save perhaps the presence of grave general diphtheritic infection; and finally that, when no such contraindication is present, and the dyspnœa is continuous and increasing despite all other treatment, the operation is positively indicated, and it becomes the duty of the practitioner to recommend its performance, and, if the decision be intrusted to him, to unhesitatingly assume the responsibility of operating.

We have already indicated with sufficient clearness the influence which the age of the patient, the period of the disease, and the character of the epidemic exert upon the results of tracheotomy. But we would again allude to the marked manner in which the result is modified by the character of the previous treatment, and to the fact that its success is very much interfered with by the earlier employment of any debilitating measures, such as were, until lately, but too frequently adopted.

We have more than once been asked by the parents of children, upo whom tracheotomy was about to be performed, or who had actually undergone it, what influence would be exerted by the effects of the operation, should it be successful, upon a subsequent attack of croup; an since, as has already been seen from the cases quoted by us from ou own experience, second attacks of croup are not very rare, it is interesting to know, that so far the statistics which bear upon this question ter to show that a previous attack of croup cured by tracheotomy i

Mode of Performing the Operation.—Tracheotomy being an operation which all physicians, whether experienced or not in the use of surgical instruments, are liable to be called upon to perform at a moment's notice, no apology is needed for the introduction here of the details of its performance. The following account is in great part borrowed from the pages of that most experienced tracheotomist, Trousseau,[1] and from a very complete and practical discussion of the operation by F. Howard Marsh, Esq.[2]

The child should be carefully wrapped up, so as to avoid all exposure to cold; and if an anæsthetic is to be employed, should be allowed to sit or lie in any position he may choose during its administration, as the constrained position necessary during the operation tends to increase the difficulty of breathing. He should then be placed upon a table, furnished with a thin mattress, and a folded pillow or roll of cloth should be placed under the shoulders and back of the neck, so as to put the skin of the throat upon the stretch, and render the trachea prominent. If the operation is performed during the day, the table should be drawn close to the window, and the patient's face directed *toward* it, so that a full light may fall upon the throat; if, however, it be at night, a special assistant must be intrusted with the duty of holding the candles or lamp. An assistant is also needed to stand behind the patient and hold the head securely; and another, whose duty shall be to draw aside the successive layers of tissue and the bloodvessels with a hook, and to sponge the wound from time to time.

The instruments needed are a sharp-pointed, slightly curved bistoury; a blunt-pointed bistoury; two flexible hooks; a dilator to stretch the incision in the trachea so as to favor the introduction of the canula, and made like a pair of curved dressing forceps, with a little spur projecting backward, so as to catch in the tissues and prevent its displacement; and finally a canula. The size and form of this canula are matters of great importance; and of late years several marked improvements have been effected in them. The calibre of the canula should, as first clearly directed by Trousseau, be as large as possible without interfering with its easy introduction into the trachea, and its curve should be that of a quarter of a circle.

In regard to this very important question of the size of the canula, we are indebted to Mr. Marsh (*loc. cit.*) for a series of observations, which appear to indicate that a tube somewhat smaller than that recommended by Trousseau, Fuller, and others, may be equally efficient and yet less irritating. By a series of careful measurements of the respective diameters of the trachea and cricoid cartilage, he established the fact that the latter diameter is almost invariably less than that of the trachea, to an extent varying from $\frac{1}{40}$th to $\frac{6}{40}$ths of an inch. If, therefore, as his measurements show, the diameters of the trachea are as follows: during the first two years of life, $\frac{10}{40}$ths of an inch; in the third year, $\frac{11}{40}$ths; in the fourth and to the seventh, $\frac{13}{40}$ths; in the eighth and ninth, $\frac{15}{40}$ths; and in the tenth, $\frac{16}{40}$ths; it will be seen that a canula having a diameter of $\frac{10}{40}$ths of an inch will answer for children between the ages of 1 and 4 years; one of $\frac{11}{40}$ths for children between 5 and 8 years; and one of $\frac{12}{40}$ths for children between 9 and 12 years old.

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[1] Clin. Méd., 2 ème ed., tom. i, p. 414 et seq.

[2] St. Barth. Hosp. Rep., vol. iii, p. 331 et seq.

It may be added that after the 12th year the diameters of the cricoid cartilage and trachea increase so rapidly, that the canula now usually made for adults, with a diameter of $\frac{14}{40}$ths of an inch, is rather small for children between 14 and 16 years old.

The length of the canula should be sufficient to cause it to reach from ½ to 1 inch below the inferior angle of the wound in the trachea.

The canula must also be double, the outer tube having a broad collar in front, with holes through which the band which passes around the neck and secures the canula in position, may be passed and tied. It should also be furnished with a key, which plays easily in a notch on the upper part of the inner tube. This inner tube must so fit the larger one, as to be readily removed and replaced, being secured in position by the little key above-mentioned.

In some canulas a still further improvement is introduced, by having the outer tube and collar merely yoked together by means of two arches on the collar, which receive small outjutting bars at the sides of the upper extremity of the outer tube, so that this can shift its position according to any pressure it may receive.

There is also a canula recommended by Fuller, called the "bivalve canula," the outer portion of which is not a tube, but consists of two narrow lateral blades, which are easily compressd by the finger and thumb into the form of a thin wedge, and expand again when the pressure is removed. This instrument supersedes the need of any dilator, and has the great advantage of being readily introduced. It is evident, however, that it must produce much more irritation while in position, than a tubular canula, and in addition, when the inner tube has been removed, as is frequently required, its reintroduction causes pain and irritation, from the constriction of the mucous membrane which has bulged inward between the blades of the outer portion. Mr. Marsh, therefore, advises that when there is any difficulty in introducing the canula at the time of the operation, a Fuller's tube should be used, but that this should be exchanged on the second day for one whose outer portion is tubular.

Although it is almost the universal practice to introduce a canula at the time of operation, its use has been objected to by several good authorities, as apt to cause inflammation and ulceration of the trachea, and to favor the development of pulmonary complications; and several plans have been suggested for the separation of the edges of the tracheal wound. Thus Mr. Adams, of the London Hospital, recommends the introduction of a strong metallic wire speculum, such as are frequently used in operations on the eyes, and Dr. Pancoast, of this city, employs a pair of blunt leaden hooks.

In addition to the instruments already enumerated, some operators, following the practice of the Dublin surgeons, use a hook or tenaculum to fix the trachea, while the incision is being made through its rings. This proceeding has certain advantages, especially when it is designed to excise a portion of the trachea, or in case of venous hemorrhage, as the trachea can be raised above the pool of effused blood and speedily opened, which will usually check the bleeding. It is also of service in young children, because the trachea is then so pliable and yielding, that, unless the hook be used, its anterior wall may be easily driven in front of the point of the scalpel, till it is nearly or quite in contact with the posterior, in which case the latter also may be wounded. Trousseau, Millard, and others, however, strongly object to this practice, believing it to be dangerous to so fix the trachea and oppose the movements connected with the performance of the function of respiration which is already so much impaired. Our own observation would go to show that, while the advantages to be gained from fixing the trachea are undoubted, especially in young children, the dangers have been somewhat exaggerated.

It has been recommended by several high authorities—Lawrence, Carmichael, G. H. Porter, Brainard, Fergusson—to excise a small piece of the walls of the trachea. By some this has been adopted with the view of dispensing with the use of a canula, but it is claimed that, even when one is employed, this practice renders its introduction more easy; that the tube fits the oval opening thus made much more accurately than a mere slit, produces less pressure upon the edges, and consequently is not so apt to produce caries of the tracheal rings. It seems never to be followed by narrowing of the trachea after the canula has been removed, as might be apprehended.

This practice is followed by Dr. Pancoast of this city, who, in the case he describes, excised an elliptical piece about one-third of an inch long and two-tenths of an inch broad, from the front part of the third, fourth, and fifth rings of the trachea. As already said, he does not employ either a canula or dilator, but holds apart the edges of the wound made in the soft parts over the trachea by means of a piece of thick leaden wire, bent so as to form hooks at either end. The wire is of such a length as to fit accurately around the neck when the hooked ends are placed within the edges of the incision, and thus keeps up just sufficient traction in opposite directions to maintain the wound open.

In regard to the operation itself, almost all who have had much experience in it direct that it must be performed with great deliberation and care.

The incision through the skin should be made precisely in the median line of the neck, and should extend from the cricoid cartilage to a little above the sternum. The slight white fibrous line which marks the interspace between the sterno-hyoid and sterno-thyroid muscles should then be followed as a guide for the next incision, and the muscular masses drawn aside by hooks.

The trachea is now exposed with the isthmus of the thyroid gland and, occasionally, large thyroidean veins lying upon it, and great care must be observed to avoid wounding these on account of the troublesome hemorrhage which is apt to follow. A still further reason for this caution is the occasional existence of an anomalous distribution of arteries, by which a branch of considerable size, or even the innominate artery itself, passes over the trachea directly in the course of the wound. Any bloodvessels may be drawn aside by hooks, and the isthmus of the thyroid gland may either be treated in the same way, or, if it cannot be drawn away far enough to allow a sufficient incision of the trachea, may be ligated in two places and divided between (Brainard, of Chicago), although, when possible, this had better be avoided. The trachea, having been thus carefully exposed, should be punctured just below the cricoid cartilage, and the probe-pointed bistoury being introduced and its edge guarded by the nail of the index finger of the left hand, the opening should be enlarged downwards to the extent of two or three tracheal rings.

It usually occurs that there is some hemorrhage during these incisions; but if it be venous and moderate in amount, the opening of the trachea should not be deferred, as the re-establishment of respiration will usually speedily check it.

So soon as the trachea is incised, the dilator should be instantly introduced with the blades closed; and so soon as in position these should be moderately opened. Air now enters readily, and there is a discharge of mucus, fragments of false membrane, and blood, through the opening. The canula should then be introduced upon the dilator as a guide, its entrance being evinced by the increased facility of respiration, and the escape of mucus and blood through its calibre. A guard of india-rubber or a disc of waxed cloth should then be placed between the guard of the external tube and the skin, to prevent any irritation or chafing, and the canula may be fastened in position by a tape passed around the neck.

Should blood bubble up by the side of the canula, as Géraldes observes the wound in the trachea has been made too large, so that the blood gains entrance during inspiration, and a larger canula should be at once substituted.

It occasionally happens, as in a case related by Trousseau, that th trachea is lined by a false membrane, which is partly detached and presse forward by the end of the canula, so that it completely occludes the oper ing, and thus even increases the asphyxia. When this occurs, the canul should be withdrawn, and an attempt made to seize the false membran with forceps and withdraw it.

When the operation has been a laborious one, emphysema of the nec may be met with, sometimes extending to a considerable distance, an causing great disfigurement or even seriously complicating the course the case. It results from a want of parallelism between the cutaneou and tracheal wounds, or from marked disproportion between the size that he has never, even in extreme dyspnœa, found any ill effects to result from its employment. At first the dyspnœa is increased by the inhalation, but anæsthesia is speedily established, and then the breathing becomes much calmer than before. Dr. Voss, who has also employed it, reports equally favorably of its effects; and Mr. Marsh, who has seen it administered in at least twenty cases, believes that, when carefully and slowly given, it is most beneficial. It must be remembered, however, that, owing to the asphyxia, the sensibility of the child is usually much blunted, so that, even without anæsthesia, the operation has appeared to us to cause but little pain, and has been borne by the little patients with scarcely any struggling.

After-Treatment.—Immediately after the successful performance of the operation, and the satisfactory adjustment of the canula, an almost incredible change occurs in all the symptoms of the patient. The wild restlessness of the little sufferer, with the agonized, appealing glances at those surrounding the bedside, and the frantic clutching at the throat as though to tear it open to admit air; the lividity of the surface, the noisy, hissing stridor of the respiration, all vanish as though by magic. Very frequently the child falls into a placid sleep, the skin and lips regain their normal color, and the breathing becomes regular, full, and nearly as silent as in health. This calm is not, however, to be of long duration; there are frightful dangers still to be undergone, from which nothing but the most assiduous care and skilful treatment can enable the patient to escape with life.

It may, in fact, be asserted that the much greater proportion of success which has of late years attended this operation, is to be attributed chiefly to the more judicious after-treatment which patients receive. Indeed, Trousseau has most truly said, with regard to the importance of this portion of the management of the cases: that tracheotomy, badly performed, but well treated afterwards, will end favorably in a third of all cases; whereas, tracheotomy excellently executed, but badly treated afterwards, will almost invariably be followed by a fatal termination.

It might, consequently, have been added to the contraindications already enumerated, that, unless we can secure constant and skilful attendance upon the case after the performance of the operation, there can be but little hope of obtaining a favorable result.

Wherever it is in any way possible, the constant presence, by day and night, of a physician or student of medicine should be secured for four or five days after the operation. When this is utterly impossible, all of those engaged in nursing the case should be carefully instructed how to act in the event of any emergency, so that the child shall never be without the presence of some one competent and ready to render the prompt assistance which is frequently necessary to avert instant death. The details of the attention necessary will be given a little further on.

One of the first points to which careful attention must be paid, is to give to the air to be inspired through the canula as much as possible the temperature and degree of moisture that the air attains by its normal passage through the mouth and nose. Various means have been recommended to secure this object; thus, a piece of loose coarse sponge, wetted with tepid water, and enveloped in a piece of gauze, may be applied over the canula; or, as directed by Trousseau, "the neck of the child may be surrounded by a cravat of knitted wool, or a large piece of muslin or gauze, so that the patient expires into this thick tissue, and inspires the air impregnated by the warm watery vapor which the expiration has just furnished."

This is the only means adopted by Trousseau; but we may, in addition, by the aid of a spirit-lamp, keep shallow dishes of water evaporating in the room, and at the same time employ a thermometer to regulate the temperature of the chamber, which should be uniformly kept at from 70° to 72° F., though the air should be changed frequently, so that it may be pure and fresh.

By careful attendance to this clear but long-neglected indication, we not only prevent the rapid drying of the mucus in the canula and trachea, but, as Trousseau asserts, avoid to a great extent the occurrence of pneumonia or bronchitis as sequelæ of the operation.

In regard to the treatment of the wound itself, we have already alluded to the advantage of placing a piece of lint spread with cerate, or a caoutchouc ring, beneath the collar of the canula to prevent any irritation of the skin. No sutures should be introduced into the skin incision, as the efforts during coughing will soon tear them out. Trousseau strongly advises that the edges of the wound should be cauterized daily for the first three or four days, with solid nitrate of silver, in order to prevent the formation of diphtheritic deposit.

It very soon becomes necessary, despite every care to render the inspired air moist, to cleanse the inner tube of the coating of viscid, partly dried mucus which collects on its interior, and to effect this, the inner tube should be removed as frequently as is necessary. The frequency with which this withdrawal is required varies in different cases, but it may be stated as a general rule, that it should be performed from four to twelve times in twenty-four hours.

When the tube is clear, the respiration is almost noiseless, and hence the supervention of noisy breathing is usually the indication of some obstruction in the inner tube, which should immediately be withdrawn and cleaned.

The drying of the mucus in its interior may be partially prevented by dropping, every half hour, a few minims of tepid water into the mouth of the canula, and by smearing the inner surface of the tube with pure glycerine, every two or three hours. Some years ago,[1] Barthez recommended instillations of tepid solutions of chlorate of soda through the canula after tracheotomy, in the hope of effecting the softening of the false membranes, and their more rapid and complete expulsion. Although he was inclined to attribute a beneficial effect to the practice at the time, it appears to have since fallen into disfavor even with its originator.

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[1] Bull. Gén. de Thér., May 30, 1858.

We have ourselves employed lime-water in several cases, and always with obvious relief. We were induced to use it from its well-known solvent action upon pseudo-membranous exudation, and have generally employed it by atomizing warm lime-water through the canula every few hours, or so often as the breathing becomes noisy and labored, despite the removal and cleaning of the inner tube, from the collection of viscid mucus or pseudo-membrane below the end of the canula. The atomization has been continued for a moment or two, and has usually excited cough, while at the same time it softened the viscid mucus and enabled the child to reject it through the tube. So great, indeed, is the relief at times thus afforded, that in one case the little patient asked frequently that the use of the atomizer should be repeated. In all probability it does good, partly by its mechanical action in exciting cough, partly by the softening effect of the watery spray, but partly also, we are inclined to believe, by the action of the lime upon the mucus and pseudo-membranes. We are also in the habit of directing that the child shall breathe for a few minutes in every hour, the steam from slaking lime, though in all probability, this does not contain an appreciable amount of the lime itself.

It occasionally happens, however, that the breathing becomes noisy and obstructed and remains so even after the withdrawal of the inner tube, and the use of the atomizer.· The cause of the obstruction then probably consists in the presence near the end of the canula, either of a collection of dried mucus or of a piece of false membrane too large to escape through the canula. If, under these circumstances, an access of dyspnœa should ensue, the strings securing the canula should be instantly cut and the outer tube withdrawn. If this be followed by the rejection of false membrane and a return of quiet respiration, the canula may be returned; but if there is reason to fear that the trachea contains false membranes too large to escape through the tube, it is better to allow it to remain out permanently.

Millard (*loc. cit.*) recommends that the external tube should always be removed at the end of twenty-four hours after the operation, when the track of the wound is usually patulous, being lined by plastic lymph, and after waiting a few minutes for the rejection of false membranes and cauterizing the wound, be again introduced.

In those cases which progress favorably, it soon becomes necessary to decide at what date the canula shall be finally removed. It is evident that this should be accomplished so soon as possible, as the tube acts the part of a more or less irritating foreign body in the neighborhood of delicate and important structures, and yet it is only in rare cases that the patient can endure its removal before the sixth or seventh day.

At the end of the fifth day, therefore, the experiment may be tried of plugging the mouth of the canula with a little roll of wool, to learn in what degree the larynx has become patulous. Should the child be unable to take a single respiration, the experiment may be deferred for several days, but should breathing be performed through the mouth for several minutes, the measure may be repeated daily, in order to gradually accustom the larynx to a resumption of its function.

About the seventh or eighth day the tube may be removed for an hour or two; and, if its abstraction be well borne, be finally withdrawn the following day, and the wound closed by bringing its edges together with adhesive plaster. It is very necessary to observe the caution that the canula must never be removed unless some one competent to replace it is at hand. It occasionally happens, however, that the larynx remains impervious for a much longer time, and cases are recorded in which it has been impossible to remove the canula for fifteen, twenty-five, forty-four (Trousseau), or even one hundred and twenty-six (Fock) days; or even for months or years. The causes which thus delay the period at which the tube can be removed, are summed up by Mr. Marsh (*loc. cit.*) as follows:

1. Obstruction of the larynx by false membranes, which have been known to linger in its cavity for at least fourteen days after the operation.
2. A chronic inflammation and thickening of the mucous membrane of the larynx, which may remain after the acute disease has passed off.
3. A narrowing or complete obliteration of the passage of the larynx by the growth of granulations above and around the canula.
4. An impairment or complete loss of those functions of the muscles of the larynx which regulate the admission of air through the rima glottidis.
5. Adhesions of the opposed surfaces of the vocal cords.

After the removal of the tube, the wound heals, either by contractin from the circumference toward the centre, when air escapes until the ver last day; or the tracheal wound first closes, and the cicatrization the advances externally. The average time occupied by this process of cica trization, is about one month, though it may be completed in two week or be protracted for two months.

Among the results which have been known to follow the prolonge stay of the canula in the trachea, are necrosis of the tracheal cartilages and ulceration about the wound, or of the trachea around the canula which, in several cases, has been followed by fatal hemorrhage. Suppu ration among the deeper structures of the neck, even extending into th anterior mediastinum, has been noticed in a few instances, when th deep-seated tissues of the neck had been much disturbed.

General Treatment.—Having carefully discussed the managemen of the canula and the treatment of the tracheal wound, it remains to sa a few words in regard to the general treatment of the patient after th operation.

The most essential point to be secured is, unquestionably, the prope alimentation of the child. It is, however, frequently very difficult to i when both wine-whey and milk-punch are rejected, iced wine and water, or brandy and water will be relished. Unfortunately, however, it not rarely happens that, owing partly to the soreness of the throat and partly, undoubtedly, to the pain caused by the canula during the movements of the trachea in deglutition, the little patient utterly refuses to swallow more than a mere sip of iced water. Under such circumstances, so serious a complication is abstinence, that Trousseau recommends that it should be forced to take a little food. "Do not fear," he says, "to employ intimidation. In such cases I have often—assuming an apparent severity, the expression of which I have exaggerated—forced the child to eat, and so have prepared the way for a recovery, which, without this, seemed to me impossible."

Even by this means, however, it may be impossible to secure the administration of a sufficient amount of nourishment, and we would then advise the use of nutritious enemata, consisting either of the yolk of one egg, beaten up in an ounce of milk, or of one ounce of beef-tea, and given about every four hours. If they appear to irritate the rectum, and are not retained, one or two drops of laudanum may be added to each enema.

In comparatively rare cases there exists, in addition to this unwillingness to eat, a positive difficulty in swallowing liquids. This results from the inaction of the vocal cords and epiglottis, which allow the fluid to pass through the glottis into the trachea and bronchia, causing violent cough and escaping through the artificial opening. The child is so alarmed by this, that it sometimes refuses all nourishment, and can only be supported by nutritious enemata. Under these circumstances, Trousseau advises that all liquid aliment should be interdicted, and that the food of the child should consist of very thick soups, vermicelli boiled in milk or broth, hard eggs, eggs very much cooked in milk, and rare-cooked meat, in rather large morsels. If the thirst becomes ardent, he allows pure cold water, taking care to give it either some length of time after, or immediately before, the meals, in order to avoid vomiting. This difficulty in swallowing rarely begins until three or four days after the operation, and does not usually last beyond the tenth or twelfth day. Sometimes, as M. Archambault has suggested, the child is enabled to swallow with ease, by closing the canula with the finger at the moment of deglutition, but at other times this fails entirely.

In many cases the difficulty in inducing the child to swallow, after the operation, is so great that all medication must be suspended, excepting the administration of small doses of opium, by the mouth or by enema, which we would advise to be continued.

Whenever it is practicable to give remedies, however—without interfering with the ability and willingness to take food—it is very important to bear in mind that despite the very great relief which the operation may have afforded, it has by no means put a stop to the disease, but has simply afforded the system another chance to overcome and cast off the constitutional affection.

Of course, the use of emetics must be suspended, and so if, on any theoretical ground, any depressing remedies have been employed, they should be discontinued. But we should recommend, under such circumstances, that the use of the combination of chlorate of potash, tincture of chloride of iron, and sulphate of quinia should be persisted in.

We subjoin the histories of two cases of true croup, which have lately occurred in our practice, and which will serve to illustrate clinically the remarks that we have made upon this disease.

In both cases tracheotomy was performed by Dr. H. Lenox Hodge, in one instance with complete success, but in the other with a fatal result.

The first and successful case was under the care of Dr. R. Bolling, of Chestnut Hill, and was seen in consultation by Dr. J. F. Meigs, and, subsequently to the performance of the operation by Dr. Hodge, by Drs. Edward Rhoads and William Pepper.

The second case was visited by both of us from the first; and was attended, after the performance of the operation by Dr. Hodge, with the most zealous and skilful care, by Drs. Wharton Sinkler and M. Longstreth.

### *Angina with Membranous Exudation on Tonsils—Membranous Laryngitis: Tracheotomy at end of second day—Complete Recovery.*

CASE 1. F. W., æt. 7½ years, a delicate child, who at the age of 4 years had suffered from a severe attack of true croup, from which he recovered without the operation. On December 23d, 1868, he was noticed to have the symptoms of an ordinary cold in the head, with slight sore-throat, some dysphagia, and laryngeal cough; he was visited and prescribed for by Dr. R. Bolling. On December 24th, the cough persisted, and there was slight coryza and redness of fauces, but without any membranous deposit o any croupy symptoms.

He was ordered small doses of Kermes mineral, Dover's powder, an nitrate of potash, and counter-irritation to the throat.

At 5 A.M., December 25th, the child, who had gone to sleep quietl waked in a frightful paroxysm of dyspnœa, gasping, clutching at it throat, and with oppressed whispering voice.

Emetics of alum were given and produced free emesis, but without th rejection of any false membrane, nor was any yet visible in the fauces The powders were continued.

The dyspnœa persisted and grew steadily worse; the voice remaine suppressed. Membranous exudation was noticed in the evening on th tonsils, and during the following night, the obstruction to respiratio became so intense that, after consultation with Dr. Meigs, tracheotom was performed by Dr. H. Lenox Hodge. The trachea was opened jus below the isthmus of the thyroid gland. No false membrane could b seen at the level of the opening, nor was any rejected.

and iron, but the child absolutely refused to take it. The breathing became somewhat easier, but at 9 A.M., December 26th, it was 66, and the pulse 160.

The internal tube was frequently removed and cleansed of very thick viscid mucus, which rapidly collected in it; and the other treatment was continued. In the afternoon it became evident that the internal tube was entirely too small, and it was therefore abandoned and the external one alone retained. Warm lime-water was now atomized down the tube every two hours, and on the first occasion of its use was followed by the rejection of a large piece of thick, dark-gray, glue-like false membrane. This was followed by marked relief to the dyspnœa.

The child was kept gently under the influence of opium; and was nourished by enemata of beef-tea, f℥j; brandy, fʒj; tr. opii, gtt. iv, given every three hours; which were retained unless they provoked a fecal discharge, which happened two or three times. The urine was passed freely, and was not albuminous.

The respirations were conducted solely through the tube, and once during sleep fell as low as 32.

*December* 27.—Still refused to eat, and the bowel also became somewhat irritable, so that several of the enemata were rejected. The respirations varied from 35 to 48; the pulse from 132 to 140. The treatment was continued; the atomization of lime-water through the tube being repeated every three hours. Towards the close of each interval the face became flushed, and the child grew restless, throwing the arms about excitedly, at times leaping up in bed, and turning round so as to lean forward on the pillows and bury his face in his hands, or else looking round with an appealing expression. The atomization was always followed by cough, and the rejection of pieces of false membrane and thick puri form matter. Towards evening he began to swallow some food.

*December* 28.—The tissues of the neck had become so much infiltrated and swollen, that the canula was no longer long enough to reach from the cutaneous surface into the trachea; it was in this way pushed forward till it obstructed the tracheal opening and caused great dyspnœa. It was consequently removed, and the child, though much exhausted, sank into a gentle refreshing sleep, with quiet regular breathing. The tube was not replaced, the breathing being readily performed through the wound. There was still marked indisposition to take food, and for a few times he was forced to swallow by holding his nose and pouring beef-tea down his throat; this was not, however, continued, as the effort exhausted him very much, owing to his most violent resistance. The discharge from the trachea through the wound was quite fluid, purulent, and very fetid. A solution of carbolic acid, gtt. x, in Oss of tepid water, was atomized through the wound; and the atmosphere of the room was kept impregnated by atomizing a stronger solution about the chamber.

During the day he swallowed more food; gr. ¼ of opium was given twice; his circulation and respiration improved.

*December* 29.—Condition still improving. Respirations 28, quite full and deep, without râles; pulse had fallen steadily from 114 to 84, and was more full and strong. The color of surface was better. Respiration carried on partly through the mouth.

*December* 30.—The child passed a very comfortable day. The respirations were about 24; the pulse 78 to 86, soft, full, and strong; the capillary circulation good. Food was taken much better, the child eating a croquette made soft with cream, the soft part of several oysters, a small piece of breast of partridge cut fine and rubbed up with butter and salt, and drinking sherry wine and water, and rich chocolate. The discharge had lost to a great extent its offensive character. Took gr. ss of opium at night, and slept five hours quietly.

*December* 31.—The child's condition was better in every way. The wound was contracting, the edges of the tracheal opening white and clean, and granulations beginning to project over it. The cough was stronger and more laryngeal, and the voice stronger and clearer, though still whispering. A good deal of the discharge was now raised into the mouth and expectorated. The gauze with which the wound had been covered was changed for a piece of patent lint, to encourage the larynx to gradually resume its functions.

From this time the case steadily improved. The matter expectorated grew more and more mucoid, thin, whitish, and scanty, and finally expectoration ceased almost entirely. The general symptoms rapidly improved, though he remained weak and nervous for six weeks. The external wound was covered with patent lint, at first of one, then of several thicknesses, and he gradually regained the power of breathing through the larynx, and of speaking. The larynx seemed quite clear after January 2d, 1869, eight days after the operation. The wound granulated from the bottom outwards, and was entirely cicatrized by the end of six weeks; by which time he was about the house, and had returned to his studies to occupy his mind, as he was very fretful and nervous.

*November* 1, 1869.—F. W. remains perfectly well, and is indeed enjoying more robust health than for several years before this attack of membranous croup.

*Angina with membranous patches on tonsils; Membranous Laryngitis; Tracheotomy on tenth day; Death on thirteenth day (fifty-eight hours after operation). Autopsy.—False membrane extending from tracheal wound to third division of bronchi; right lung emphysematous; left lung collapsed; blood dark and fluid.*

Case 2. K. B., girl, æt. 6 years and 1 month; rather tall for her ag
Her parents are healthy; but she herself had suffered much

she complained of sore throat, and Dr. J. F. Meigs was called and found small patches of exudation on the tonsils.

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|---|---|
| ℞. Potass. Chlorat., . . . . . . . | gr. ij. |
| Tr. Ferri Chloridi, . . . . . . | gtt. v. |

Every third hour in a teaspoonful of syrup and water.

During the night, violent dyspnœa, with noisy gasping breathing came on, for which emetics were employed with some relief.

*On Saturday*, 9*th*, there were patches of membranous exudation on the fauces and tonsils. The cervical lymphatics were only slightly enlarged. The breathing was difficult and stridulous; the voice feeble, small, usually whispering, but when raised by an effort, was rather piping and shrill; the cough was short and smothered. There was no coryza. Treatment continued, and inhalations of the vapor from slaking lime ordered every hour.

*On Sunday*, 10*th*.—The child was restless, with at times marked jactitation; face flushed and expression anxious; respiration labored; inspiration imperfect, with shrill stridor; expiration prolonged and stridulous. No expectoration. Membrane still visible in fauces. No albumen present in urine. Pulse frequent, skin hot and moist. Treatment continued, and cloths wrung out from hot water applied to the throat.

*Monday*, 11*th*.—Condition about the same; the degree of dyspnœa varying from time to time with degree of spasm, but the breathing still continuously labored and stridulous. Treatment continued, and frictions with turpentine liniment directed to be made to the throat. Marked unwillingness to eat.

*Tuesday*, 12*th*.—There was marked improvement in the child's condition. The breathing was easier and less stridulous; the cough less frequent and looser, with a few thick yellowish purulent sputa; the voice was raised with less difficulty and was clearer and stronger. There was, however, the same faucial pain and obstinate indisposition to eat. The fauces were still red and swollen, and a small thin patch of exudation was visible on one of the tonsils. The treatment was continued, and the child also took a little port wine and water and beef tea, and had nutritious enemata of egg given every four hours.

*Wednesday*, 13*th*.—The condition of the fauces was better, the breathing easier and the voice more clear. The skin was still heated, pulse frequent, and there was still indisposition to eat.

During the ensuing night, the breathing again became more oppressed and tighter, with some return of stridor. The voice also became suppressed and whispering. The circulation was somewhat obstructed, the face becoming flushed and the lips rather dark.

*Thursday*, 14*th*.—These symptoms were aggravated, and in the evening there was marked jactitation and restlessness. The respirations were 40 in the minute, and stridulous, with prolonged expiration; and, during the inspiratory effort, with violent action of the external respiratory muscles, elevation of the shoulders, and recession of the base of the chest and of the epigastrium. There was also complaint of pain at the epigastrium. The cough was infrequent, short, smothered, and muffled. The eyes were anxious, staring, and prominent, with large pupils. The pulse was fre-quent, 140, and small.

During the night there was a steady aggravation of all these symptoms. The respirations rose to 46, and became extremely obstructed, the reces-sion of the base of the chest and at the epigastrium being unusually marked during inspiration. The voice was whispering and almost sup-pressed; the expression strained, appealing, and anxious; the face deeply flushed and the lips livid. There was the same complaint of constant pain at the epigastrium.

*Friday* 15*th*, *at* 7½ *A.M.*, respirations 36, pulse, 136. Tracheotomy was performed by Dr. H. Lenox Hodge, the trachea being opened just below the isthmus of the thyroid gland, and a small oval piece excised from its walls. A good deal of venous hemorrhage occurred during the operation, but stopped immediately after the trachea was opened, and the tube adjusted.

No anæsthetic was used, but the child made no resistance, and evi-dently was slightly benumbed from asphyxia. Soon after the operation the respirations grew more easy, a large piece of false membrane was thrown off through the opening, the flush disappeared from the face, and the features became composed and placid.

Very soon after the operation the respirations fell to 28, and through-out the day remained easy and regular. The pulse fell to about 120. Th child slept well, but would eat but little, and still had enemata of bee tea, f℥i, q. t. h., given it. The air of the room was kept pure, but war and moist. The canula was covered with folds of gauze moistened wi lime-water, and the wound was covered with a piece of greased linen. as to protect it from the canula. The inner tube was removed every hou cleaned, anointed with glycerine, and returned. Warm lime-water wa atomized through the tube every three hours, and always produced stron coughing, with the expectoration of thick purulent matter, and occasio ally of flakes of tough white false membrane. All medication was su pended, save the administration of gtt. ii, or iii, of Tr. Opii Deodora sufficiently often to keep the child gently under its influence. During th ensuing night the internal tube was removed, owing to the difficulty i expelling the thick viscid mucus.

*Saturday*, 16*th*.—The respirations were 24; pulse 116. During the da the child took more beef-tea and wine and water, but still had nutritio enemata given. There was great thirst, and she still complained of pa in swallowing. There was no coryza, and very slight, if any, enlarg ment of the cervical lymphatics.

Towards evening, breathing again grew obstructed, evidently from a about every two hours, and with such great relief that she several times asked for it herself by signs, as it each time provoked cough, and caused the expulsion of thick purulent matter, dried mucus, and shreds and flakes of false membrane. Urine was discharged freely, and contained no albumen.

*Sunday*, 17*th*.—In the morning she appeared quite comfortable. The voice was still whispering, but the cough seemed looser, and she expelled purulent matter more freely through the opening; no false membrane was discharged. The thirst was still great, but the child took beef-tea more freely. The bowels have for several days been opened two or three times daily. Respirations 20–25; quite full, without recession of the base of the chest. Pulse 130–136, of rather better volume. Hands fairly warm, though at times there was a little tendency to coolness. The wound was evidently contracting. Slight emphysema of the base of the neck, which caused complaints of pain about the neck and shoulders.

At 4 P.M. it was observed that the breathing was again growing obstructed, and that there was recession of the base of the thorax during inspiration. Lime-water was freely atomized through the opening, but without causing any discharge of membrane. The difficulty of respiration increased until 5½ P. M., when suddenly symptoms of asphyxia appeared. Prolonged efforts at artificial respiration were made, and life was thus maintained for a short time, but no essential relief was afforded, and death soon followed, on the thirteenth day of the disease and fifty-eight hours after the operation.

The chest was frequently auscultated throughout the course of the case. Before the operation it was impossible to isolate any respiratory murmur, owing to the loud, snoring, whistling, and cooing tracheal and bronchial râles. After the operation, and still more after the final removal of the canula, a faint respiratory murmur could be detected, mingled with the above râles. On the morning before death only was there an obscure flapping sound transmitted to the ear with the tracheal and bronchial râles, but even then it was indeterminate in character.

During the efforts at artificial respiration, a long tubular false membrane was ejected. It had evidently been the immediate cause of death.

AUTOPSY, twenty-four hours after death. *Brain* not examined.

*Thorax and air-passages.*—The wound in the neck looked well, without pseudo-membranous exudation. The larynx itself could not be examined. A long false membrane, extending from the tracheal opening down through the right bronchus to the third or fourth division, lay loose in the trachea, having been detached from the mucous membrane. In the bronchia it was still slightly attached, but separated readily on traction. It was firm, very tough, and white, and, in the upper part of the trachea, at least one line thick. Below the bifurcation it was tubular for the rest of its course; and in its terminal portions grew softer and more yellowish. There was also, in the trachea, a large patch (1½ inches long by ½ inch wide) of false membrane, of dull white color, and tightly adherent. Upon raising it, numerous little delicate fibrous prolongations were seen attaching it to the mucous membrane. Beneath this patch the mucous membrane was deeply reddened, dry, excoriated-looking, and slightly roughened by minute elevations. There was no enlargement of the mucous follicles. The vascularity of the mucous membrane diminished in the lower part of the trachea, and was but slightly marked in the secondary divisions of the bronchi. No ulceration was seen at any point. There was no pseudo-membrane in the left bronchus or any of its branches, and the mucous membrane here was less reddened than on the right side. In all probability the false membrane removed immediately after death had come from the left bronchus. The right lung was largely distended, the posterior border dark and congested, but the rest of the organ pale and emphysematous. The left lung was dark, purplish, non-crepitant, collapsed, and yielded on section an abundant flow of dark, airless, bloody serum. No pleurisy or pleural effusion.

*Heart.*—The left ventricle was very firmly contracted and empty, and the tissue of its walls hard, tough, and florid red. The walls of the right ventricle were relaxed, and the cavity filled with fluid dark blood, without any clots. No excess of pericardial effusion.

The liver and kidneys were gorged with dark blood.

## CHAPTER II.

### DISEASES OF THE LUNGS AND PLEURA.

#### GENERAL REMARKS.

It would be difficult, perhaps, to over-estimate the importance to the medical practitioner of a thorough knowledge of the different diseases of the lungs and pleura, as they occur in children. The diseases of the respiratory organs—and much the most frequent of them are pneumonia and bronchitis—cause, according to Dr. West, of London, very nearly a third of all the deaths under five years of age in England; while not above one child in four dies under that age from diseases of the nervous system, and not above one in seven from those of the digestive system. In this country, it would seem, from the bills of mortality, that a larger proportion of children die of diseases of the digestive than of the respiratory system. But, while this is true, there can be no doubt that the diseases of the latter system are deserving of our utmost attention, since not only are they of constant occurrence and of fatal tendency, as idiopathic affections, but monary tissue, to which the term collapse has been applied, is very apt to occur.

The morbid condition of the lung last referred to, that of collapse, is one that has been well understood only within a few years past, and yet it is so important a one, in a practical point of view, as to excite a feeling of surprise that it had not been discovered before.

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## ARTICLE I.

### ATELECTASIS PULMONUM, OR IMPERFECT EXPANSION OF THE LUNG.

The title of atelectasis pulmonum, from ατελης, imperfect, and εκτασις, expansion, was first employed by Dr. Edward Jörg, to designate a condition of the lungs observed by him in new-born children, a condition in which larger or smaller portions of those organs had never been penetrated by air. The respiration of the infant had been established, in such cases, more or less imperfectly, at birth, and some parts of the pulmonary tissue had, consequently, never undergone expansion under the distending influence of the inspiratory act; these undilated parts continued in the fœtal state.

In addition to this *congenital* form of imperfect expansion of the lung-tissue, this condition is met with at all ages of life, though with especial frequency in young children, as the consequence of a *collapse* of portions of the once expanded lung, or, in other words, of their return to the fœtal or unexpanded state. To this latter form of imperfect expansion, the terms post-natal atelectasis, collapse, and fœtal condition have been given. Before the discovery of its real nature was made, it had often been described also under the well-known names of carnification and lobular pneumonia. We shall designate it by the title of collapse or post-natal atelectasis, while under that of congenital atelectasis pulmonum, we shall describe the congenital variety of imperfect expansion.

### CONGENITAL ATELECTASIS.

Anatomical Appearances.—In congenital atelectasis the parts of the lung most frequently affected are the posterior portion and lower edge of the inferior lobes, the middle lobe of the right lung, and the languette and lower edge of the upper lobes. In some instances, that we have examined, the greater part of the lower lobes of both lungs, while, in others, still larger portions of these organs have been found to present this condition. The imperfectly expanded portions of the lung are of a dark-red, or purplish color, and are diminished in size, so as to be depressed below the level of the healthy parts. They are solid to the touch, and yet they have not lost their cohesive properties, as they are neither friable, easily torn, nor readily penetrable by the finger; their cut surface is perfectly smooth; they do not crepitate under the finger, and no air-bubbles are seen in the fluid squeezed out by pressure; they sink when thrown into water. They, in fact, resemble exactly the fœtal lung. The most convincing proof of the real nature of this condition is obtained by the inflation of the lung. When this is done, the depressed, hard, and dark-colored portions—unless the subject from whom the specimen has been taken may have lived long enough to have allowed the different tissues of the lung to become adherent—rise to their natural level, become elastic, soft, and crepitating, and change, under the influence of the entering air, from a dark and livid tint, to the rosy or pink color of healthy pulmonary tissue. In recent cases, this inflation is performed with great ease and with perfect success, while in other instances, in which the child has lived for some weeks or months, the distension is either effected only by strong efforts, or in a very imperfect manner, or it may fail entirely, owing to some permanent change having taken place in the tissues of the unexpanded portions. In a case that occurred to ourselves, the subject of which died at the age of fourteen months, of acute pleurisy of the right side, after having presented, at birth and throughout its short life, many of the symptoms of atelectasis, the inferior two-thirds of the lower lobe of the left lung exhibited in the greatest perfection all the atelectasial characteristics. The whole of the unexpanded part was distended by means of inflation with a blowpipe, but only after repeated and powerful expiratory efforts; and Dr. E. Wallace, who made the examination, assured us that he was obliged to use a degree of force much greater than he ever employed to inflate healthy adult lungs.

In most cases, the foramen ovale and the ductus arteriosus are found to be still open, or the latter has but partially closed.

The *causes* of congenital atelectasis have not been satisfactorily ascertained. The only conditions that have been well made out as probable causes, are: original debility of the infant, from any cause that has interfered with its proper development in utero, as feeble health on the part of the mother during pregnancy, or multiple pregnancy; and acquired debility, brought about by the fact of the infant's being exposed at birth to unfavorable hygienic influences, and particularly to those which interfere with the proper performance of the respiratory act, as cold, a vitiated and close atmosphere, and the use of too heavy or tight clothing. A very hurried and rapid labor has been thought to cause, in some instances, this imperfect expansion of the lung-substance. In a case that occurred to one of us (see *Am. Journ. Med. Sc.*, Jan., 1852, p. 83), the only explanation of the condition, which seemed at all plausible, was that the placenta had been separated from the uterus at too early a period of the labor, in consequence of the violent and rapid character of the latter, so that the child was for a short time before birth cut off entirely from its most of the cases. These are the following: the child comes into the world feeble and weak, and instead of crying vigorously and loudly the moment or very soon after it is born, it fails to cry at all, or the cry is low and weak, or it is whimpering or wailing; the color, instead of being brick-red or dark-red, is pale and whitish, leaden, or livid; the muscular movements, which, in healthy children, are strong and vigorous, are in these, languid and slow, or there are none or scarcely any, the limbs being relaxed and motionless. If the breathing is observed, it is found to be short, high, and imperfect, and it is evident that the thorax is but imperfectly dilated at each movement of respiration. When these symptoms exist in a very marked degree, the infant either dies soon in a state of asphyxia, or, the muscular force slowly increasing, the respiration gradually improves, and the child is, after a longer or shorter time, either out of danger, or it falls into the same state as that of one in whom the symptoms have been from the first less severe. Under the latter circumstances, the infant continues feeble and weak. It breathes shortly, rapidly, and imperfectly, but often without any appearance of labor. The cry is rare, and, when heard, is low and feeble, or there is a constant plaintive moan, which is very characteristic, and strongly expressive of exhaustion, with each respiration. The color continues pale and whitish, or it is bluish, and the temperature of the extremities is lower than natural. The child sleeps the greater part of the time, and is unable to nurse or nurses very feebly, but can swallow when fluid is poured into the mouth. In such cases as these, the infant does not necessarily die, but will often recover when properly treated. In favorable cases, the symptoms just enumerated may last from a few hours to a day or two, or even a few weeks, without much change; then, under the influence of correct hygienic and medical treatment, they will often begin to improve. The color becomes less pale or less bluish; the muscular movements are somewhat stronger; the child begins to cry, and in a louder tone; the act of swallowing is easier and more perfect, or the infant is able to suck when applied to the breast, at first feebly and only for a moment, and then more strongly; the respiration becomes slower, fuller, and more natural, and gradually the dangerous symptoms disappear.

In unfavorable cases, on the contrary, the respiration fails to improve, but becomes more and more short, quick, and imperfect; the temperature of the body falls; the color of the surface changes, becoming leaden, bluish, or even livid, the change showing itself first in the neighborhood of the mouth, and in the hands and feet, and extending gradually to the rest of the body; the difficulty in swallowing becomes greater, and very generally some spasmodic twitchings begin to show themselves about the muscles of the face. The respiration is very often attended with slight wheezing or rattling, and the convulsive movements returning frequently, and becoming more violent and more general, the child dies in convulsions, or it sinks very slowly and gradually, without convulsions, as though in a state of syncope.

There is another symptom of imperfect expansion of the lungs in newborn and very young infants, which ought not to be passed unnoticed.

It is one mentioned by Dr. George A. Rees, of London, in an essay on this subject (London, 1850), and which is regarded by him as the pathognomonic symptom of the condition. It is an altered movement of the ribs in respiration. During the inspiratory effort the ribs are seen to move inwards toward the mesial line of the trunk, instead of outwards as in ordinary respiration, thus diminishing instead of expanding the transverse diameter of the thorax. The explanation of the altered movement is as follows: when the diaphragm descends, the lung ought to expand in such a way as to fill up the increased space produced in the thoracic cavity by the descent of that great muscle. Instead of this being the case, however, the lung is collapsed and inexpansive, and cannot enlarge sufficiently to fill up the space alluded to, so that there would remain a vacuum in the chest were it not that the thoracic walls are driven inwards by the pressure of the atmosphere upon their outer surface. In a case that we saw ourselves in a child fourteen months old, who had presented symptoms of atelectasis from birth, and in whom we found after death very extensive collapse, this symptom was very marked. The base of the thorax was indented on both sides by a deep gutter or depression, which remained depressed and unchanged during the inspiratory movements, or which, indeed, rather became more distinctly visible during those motions, so that the chest presented the curious spectacle of dilatation or expansion in its upper parts, during inhalation, and of contraction or collapse at its base.

SYMPTOMS OF COLLAPSE IN THE EARLY WEEKS OF LIFE.—Before taking up the regular consideration of post-natal collapse, as it occurs at all ages of childhood, we wish to refer, for a moment, to that condition as it appears in the first few weeks of life, in infants who have exhibited no sign of it whatever, perhaps, at the moment of birth. We desire to do this now, because the symptoms which it gives rise to resemble much more those of congenital atelectasis, than those of collapse in children over a few months old. And let it be remarked, that these symptoms are very different, and much more severe and threatening than those of collapse at later periods. They are in fact those of cyanosis, and, in some instances, are as strongly marked as those observed in the worst cases of that condition, caused by malformation of the heart or great vessels. The cyanosis and other symptoms of disordered circulation, evidently depend on the obstacle offered by the collapsed and condensed portions of lung-tissue to the discharge of blood from the right side of the heart. Though this obstacle to the venous circulation is doubtless the chief cause of the symptoms in these cases, we cannot but think ourselves, that the great difference between the symptoms of congenital atelectasis, as well as of post-natal atelectasis occurring in the first few weeks of life, and the collapse

In this form of atelectasis, the child may have been born perfectly healthy, or only weaker than usual, or it may have had some difficulty in establishing the respiration, which, however, has afterwards been effected in the most complete manner. Some days, or even weeks after birth, from a cause disturbing the function of respiration, portions of the lung may collapse, and give rise to the different symptoms of that condition in the manner above described. The most important of these symptoms are difficulty of breathing, consisting either in an increased or diminished rate of that function, diminution of the muscular power, cyanotic hue of the skin, and slight or severe spasmodic phenomena. In a case that occurred to one of ourselves (see *Am. Journ. Med. Sc.*, *loc. cit.*), a child who had exhibited at birth, and for five days after, every appearance of fine health, was observed on the sixth day to cry rather violently in the morning. At one o'clock in the day he began to moan, and appeared distressed; at two he ceased to moan, became bluish, and seemed to lose his breath. He was placed in a bath, in which the blueness passed off, but the breathing continued irregular and uneven. He soon became blue again, and breathed slowly and irregularly, but had no spasm. At about four o'clock, another paroxysm occurred, in which the whole surface became first bluish, and then black, while, at the same time, the trunk and limbs became stiff and rigid under the influence of tonic muscular spasm, and the respiration was slow and imperfect. After the attack had lasted for some moments, the blueness and spasmodic phenomena disappeared, but the child remained in a state of stupefaction. There were two slight paroxysms of convulsive stiffening between this and evening, and later in the evening there was still some blueness, with irregular and short respiration. During the night the breathing was short and uneven, and attended with moaning, but on the following day the symptoms had disappeared entirely, and there was no return.

In another case the symptoms of collapse did not appear until the twenty-fifth day after birth. The infant had been hearty and strong at birth, and had established its respiration fully and completely. Between the birth, however, and the time of the attack, circumstances connected with the lactation had caused the development of diarrhœa with thrush, which had debilitated the child a good deal. On the day of the attack, frequent sneezing, with stuffing of the head, and some cough, seemed to show the existence of cold, and, on the same day, the child was unfortunately exposed, owing to the accidental opening of one of the gas-burners, to the inhalation of some gas. Late in the evening, a slight whistling or stridulous sound was heard in the breathing, the skin became suddenly a little bluish, and a slight convulsion followed. During the night there were frequent and strong convulsive seizures, always preceded and followed by deep blueness of the mouth, hands, and feet, and it was noticed that the least disturbance, as lifting or nursing, or changing the position, always brought them on. The next morning the attacks continued, but with diminished violence, under the effects of treatment, and they ceased after the middle of the day. The color of the skin had now changed; it had become rosy red, instead of pale or blue, and the hands and feet, which had been cold, were now warm and natural. There was no return after this.

In a third case a female infant, who had been perfectly well at birth and up to the moment of this attack, was put suddenly into a bath by the nurse on the eighth day, directly after its waking from sleep. The child, who was not thoroughly waked up, seemed greatly terrified, and began to scream most violently. Instead of removing the infant from the water, the nurse persisted in holding it immersed for some minutes, when it became deeply blue, and partially convulsed; it frothed at the mouth and nose, seemed to be suffocating for breath, and appeared to be dying. These symptoms continued for three-quarters of an hour, when they gradually passed away, and it fell into a heavy sleep. When we saw the infant, soon after this, the only signs of disorder that remained, consisted of an unusual paleness, drowsiness, and an expression of feebleness. Some three hours later, it waked, nursed, and from that time seemed quite well.

In a fourth case, a child born apparently well, with the exception of its having had a rather frequent respiration, and who nursed very well on the second and third day, was attacked on the fourth day with blueness, moaning, short and panting respiration, and then with slight convulsive symptoms. It was unable to nurse, and though kept perfectly still, and fed from time to time with small quantities of milk and brandy, became gradually more deeply blue, had paroxysms of very slow respiration and circulation, with general convulsive seizures, and died at the end of twenty-four hours.

The reader will also find this form of cyanosis referred to in our article on that disease.

Diagnosis.—There can be no difficulty in detecting the nature of the case when the imperfect expansion exists from birth, and when the physician is present at that event.

When, however, collapse of the lung-tissue continues after birth, and the physician is called upon to determine at the age of some days, weeks, or even months, the cause of the feeble health and puny growth of the child, or to explain those sudden attacks of collapse in very young infants who had previously well established to all appearances the respiration, the diagnosis becomes more difficult. In the former class of cases, attention to the following points will usually, however, enable us to make a correct diagnosis. The previous history is particularly important, since, in all such cases, it will be found that the infant was either still-born and resuscitated with more or less difficulty, or that it was born weak and feeble, and that the respiration had not been established as thoroughly and completely as it ought to have been. Dr. Rees states that certainly half of the cases of this form, in his own practice, occurred in twins, and that they were all born in a more or less completely asphyxiated condition. The present symptoms are also very important. The feeble appearance of the child, and its puny growth, in connection with its past history, and the absence, as ascertained by careful examination of the case, of other morbid conditions to explain the general ill-health, ought to direct the attention of the physician to the true nature of the disease; and if we add to these considerations the local thoracic symptoms, the short, rapid, and imperfect breathing, with, perhaps, the altered movement of the ribs, the indentation instead of expansion during inspiration, mentioned above; the absence of fever; and the existence of the physical signs of more or less extensive solidification of the pulmonary tissue, without those of pneumonia; there will seldom be any difficulty in forming a correct diagnosis.

The cases described under the head of collapse in the early weeks of life may be readily understood from the simple fact that the symptoms cannot be satisfactorily explained, by referring them to any other condition than that of collapse of portions of the lung, with impeded and deranged circulation.

PROGNOSIS.—The condition of imperfect expansion of the lungs in a new-born child, does not necessarily cause it to die immediately or very soon after birth. The fate of the child will depend very much upon its degree of innate strength and vigor, and upon the kind of hygienic conditions to which it may be consigned. When the child is well developed, and not enfeebled by any fault in the mother's health during the pregnancy, but merely by some momentary condition that has occurred during the labor, there is every reason to hope that proper hygienic and medical treatment may restore it to health. The danger is greatest in those who continue weak and feeble in spite of the proper measures of care and treatment for some days or weeks after birth. We have a record of ten examples of this condition in new-born children, in nine of which the symptoms persisted during a period varying between six hours and five days. Of these, seven lived, while three died in from twenty-one hours to three days.

The prognosis of the second class of cases—those in which collapse occurs suddenly in a few days or weeks after birth, and after the apparently complete establishment of respiration—will vary, of course, with the violence of the symptoms. Of five cases of this kind that came under our observation, recovery took place in three in spite of the most dangerous and alarming symptoms, while in two death occurred in a period of about twenty-four hours.

TREATMENT.—The treatment of congenital atelectasis resolves itself almost entirely into the employment of such means as tend to invigorate the general health of the child, and to promote the activity of the respiratory act. In a recent case, one dating from birth, in which the function has always been imperfect, and in which there are present great feebleness, drowsiness, and paleness or blueness, the room in which the infant is placed should be kept up to a temperature of 70° or 75°, and the child should be abundantly covered with warm clothing. Perfect quiet, or at least very gentle motion, is very important, and when there is any disposition to deep blueness or to convulsive movements, attention to this point is essential. It is in such cases, and in those in which these symptoms come on a few days or weeks after birth, that the position recommended by the late Dr. C. D. Meigs, for the treatment of cyanosis neonatorum, was found by him so useful. This position is one upon the right side, with the head and shoulders raised at an angle of 45°. It is obtained by arranging pillows in such a way as to form a plane inclined at that angle. Upon this the infant is placed, and orders are given that it is not to be moved at all, if possible, or only with the greatest care and gentleness, for twenty-four or forty-eight hours. There can be no doubt that this position and the attendant repose have, in many cases recorded by Dr. C. D. Meigs, and in several that we have seen ourselves, been of very great use in controlling the symptoms. Its good effects in cyanosis were supposed by him to depend on the fact that the septum auricularum becomes, in this position of the body, horizontal, so that the blood in the right auricle must rise against gravity in order to pass through the foramen ovale, while, at the same time, the valve of that opening is disposed to fall down by its own weight, and close the foramen, and is, moreover, pressed downwards by any blood that may enter the left auricle from the pulmonary veins. This explanation will apply, of course, only to those cases of atelectasis accompanied by very extensive and deep blueness or purple color of the surface, in which we may suppose that so much of the pulmonary tissue is solidified, as to produce a degree of obstruction to the passage of blood from the right side of the heart into the lungs, sufficient to overload the right ventricle and auricle, until the latter pours a portion of its contents into the left auricle, thus causing admixture of the two kinds of blood. In a large majority of the cases of atelectasis, however, this explanation of the benefit resulting from the treatment referred to, cannot be received, as there is no reason to suppose that in them the slight cyanotic symptoms present indicate anything more than the existence of a moderate degree of congestion of the right side of the heart, unattended by any escape of blood from the right into the left auricle. In such cases the position on the right side is useful, because it is the one most favorable to a full and easy performance of the respiratory and circulatory functions. It leaves the left side free and unembarrassed, so that the heart can act with the greatest possible freedom, while the partial elevation of the head and shoulders renders the movements of the chest more easy and complete than when the body is lying on a horizontal surface. The perfect quiescence which constitutes a part of the treatment is also very important, as in many recent and particularly in cyanotic cases, the symptoms are greatly aggravated, and convulsive attacks often brought on by moving the child, especially if this be done suddenly or rudely.

Perhaps the most important point of all in the treatment of this affection, especially when the symptoms tend to become persistent, is the mode of nutrition of the child. If possible, the infant should always have a good breast of milk, and if unable to suck, the milk ought to be drawn by means of a breast-pump, and given to the child in small quantities from a spoon. About two or three teaspoonfuls may be given at first every half hour or hour, and the quantity gradually increased until the child gains strength enough to be put to breast. If breast-milk cannot be procured, cow's milk and water may be substituted, in the proportion of one part of the former to two or three of the latter. The only medicines to be given are, at first, while the child is still very young and weak, mild stimulants, of which the best, in our opinion, is fine old brandy. Of this about five drops may be given each time that the milk is taken; or, we may make use of from three to five drop doses of the aromatic spirit of hartshorn, or of proper quantities of wine-whey.

When the symptoms of congenital atelectasis tend to persist for several weeks or months, and when we first see the patient some time after birth, the chief points to be attended to in the treatment are, as before, the mode of nutrition, which ought to be by nursing and the use of gentle stimulants and tonics. Brandy, wine, or Huxham's tincture of bark, are the best stimulants, whilst quinine, in the dose of a quarter or half a grain, three times a day, extract of cinchona, in the dose of from one to three or four grains, three times a day, or iron in the form of Queveune's powder, or in that of the iodide, are the best tonics.

## COLLAPSE OF THE LUNG, OR POST-NATAL ATELECTASIS.

General Remarks.—By collapse of the lung is meant the return of that organ to its fœtal or unexpanded state. It is in fact a condition of atelectasis or imperfect expansion of its vesicular structure. The terms collapse or post-natal atelectasis are employed to contradistinguish it from congenital atelectasis, the former being applied to imperfect expansion as it occurs in lung-tissue after previous expansion, and the latter, as stated in the preceding article, to the same condition as it exists in children who have never expanded certain portions of the pulmonary substance.

The true nature of collapse of the lung was never understood, and its great practical importance never appreciated, until since the year 1844, when MM. Legendre and Bailly published, in the *Archives Générales de Médecine* their researches on the subject. Since then various observers have repeated the investigations of those gentlemen, and thrown new light upon the matter. Among the most important of the later writers on this subject, we may mention Dr. Charles West, of London, MM. Hardy and Behier, of Paris, Dr. W. T. Gairdner, of Edinburgh, and MM. Rilliet and Barthez, in the second edition of their work.

This discovery in pathology was one of very great value, not merely because it renders our knowledge of the morbid conditions of the lungs more exact and philosophical than it ever was previously, but because it explains certain anatomical changes in the pulmonary structures, often before noticed and described, but never satisfactorily accounted for; and still more, because it points to methods of treatment much more rational and much more successful than those employed under the influence of former ideas as to the nature of the lesions alluded to. The most important result of the new views, is the disclosure of the fact that several lesions met with after death, which were formerly thought to depend on inflammation of the affected tissue, are in reality the consequences of collapse or obliteration of the vesicular structure of the lung, and not of inflammation, as was at one time supposed. The lesions alluded to are those which have been hitherto described under the names of lobular pneumonia and carnification.

The peculiar character of the lesions met with in many of the supposed cases of pneumonia, had often drawn attention and been commented upon before their real nature came to be understood. The points of difference between these alterations and those of true pneumonia were particularly noticed by MM. Denis, De La Berge, Rufz, Rilliet and Barthez, Dr. Gerhard, and Dr. West. In fact, M. Rufz, and MM. Rilliet and Barthez both approached very near the truth in regard to these lesions, each comparing them, but the former at an earlier period than the latter, to the condition of the lung of a fœtus that has never breathed. The latter writers, in the article on pneumonia, in their first edition, have described a condition of the lung which differed so much from ordinary pneumonia as to create a great difficulty in their minds as to its true nature, and to it they applied the term carnification. They were on the very verge of detecting its real character; they did in fact suggest its real character, but were so possessed with the idea that it must be the result of some inflammatory action, as to neglect to pursue their own suggestion, but endeavored to explain the condition on the ground that it was "one mode of termination of pneumonia, or else chronic pneumonia." The following passage, quoted from their work (1ère ed., t. i, p. 74), will show how closely they approached the truth: "The first idea that enters the mind on examining this tissue (carnification), is, that it resembles the lung of a fœtus that has not breathed; we should feel inclined to say that the pulmonary vesicles had not yet been dilated under the influence of the thoracic expansion, and had not, therefore, admitted air into their interior; or, rather, it would seem as though they had been obliterated by some attack of disease, perhaps inflammation, without, however, remaining engorged, and after having lost the power of dilatation."

In the second edition of their great work, MM. Rilliet and Barthez adopt, in great measure, the views of MM. Legendre and Bailly, and of Dr. Gairdner, not only in regard to carnification, but also in regard to the yet more important lesion hitherto generally called lobular pneumonia.

But it is not only the condition of the lung, called carnification, that has been shown to consist, not in inflammation, but in a collapse of the pulmonary tissue. A much more important consequence of the recent researches has been the discovery, that in a very large majority of cases the so-called lobular pneumonia, generalized lobular pneumonia, and pseudo-lobar pneumonia of different writers, are also the results of collapse of the lung, variously combined with bronchitic inflammation and chitis, and sometimes, also, with true pneumonic inflammation or congestion, has been made known, a number of symptoms occurring in the pulmonary affections of children, which were formerly obscure and irregular, have become easily explicable. It had been often observed that many of the supposed pneumonias of children did not present the same symptoms, pursue the same course, nor require the same treatment as the pneumonia of adults, or as some cases of the disease in children. In a great many of the supposed cases there was an unusually large amount of bronchial inflammation, the general symptoms were much less acute than was to be expected in a parenchymatous inflammation, and what was most singular of all, the physical signs of solidification of the lungs were very variable and uncertain, there being present on one day the signs of simple bronchitis, while on the same day or the following, and over the same region of the thorax, these would be associated with or masked by the signs of induration of the lung; and again, in a day or two, the symptoms indicative of condensation might disappear, to be succeeded yet again by those of simple bronchial inflammation. The effects of treatment seemed also to point clearly to a radical difference between the lobular or broncho-pneumonia of children, and the acute phlegmasial disease of adults. It was found, in fact, that depletory measures were seldom borne well in the lobular pneumonia of children, while in the pneumonia of the adult, and in some acute cases occurring in early life, which presented the same general symptoms and the same physical signs as pneumonia in the adult, antiphlogistics, as is well known, are amongst the most successful remedies that can be made use of.

ANATOMICAL LESIONS.—Collapse of the lung (post-natal) occurs in two different forms, the *diffused*, and the limited or *lobular*. The only difference between the two forms is in the number of lobules affected, and their mode of distribution. In the diffused variety, a large number of adjoining lobules collapse, and give a condensed and solid appearance to larger or smaller portions of the lung, most frequently to the edges, merely, of one of the lobes, but at others to the greater part or the whole of a lobe, or even the major part of a lung. In the lobular variety, on the contrary, single lobules or clusters of lobules become collapsed in different parts of a lobe or lung, and the affected portions take the form of irregular, hardened patches or tumors, situated upon the surface, or disseminated through the interior of the pulmonary texture. In the former kind of collapse, the appearance of the altered portion of the lung is somewhat that of lobar pneumonia, and it is to these cases that the terms generalized-lobular, pseudo-lobar, carnification, and splenization, have been applied; while in the latter kind, the isolated, and distinct condensed portions, have been described by the term lobular pneumonia.

The peculiar or fundamental characters of collapsed pulmonary tissue, are the same in both varieties. We will mention them as succinctly as possible, and then compare them with those of pneumonia, for the reason that it is with the lesions of that disease that those of collapse have been hitherto confounded.

Collapsed lung is generally of a dark violet color, but it may be much darker in tint, and even black, when it is much engorged with blood. Its consistence is always changed; the condensation may amount merely to slight hardening, with a diminution of the crepitation, or it may be very dense with an entire absence of crepitation, in which case portions thrown into water sink rapidly. Though more or less hardened, the tissue still retains a certain degree of flaccidity and suppleness. When cut into, the surface is seen to be smooth and uniform, having somewhat the appearance of muscle, and presenting no granulations. Pressure or scraping cause the exudation of more or less semi-transparent bloody serosity. Close examination shows that the organic elements of the tissue, the vessels, bronchia, cellular tissue, &c., can still be distinctly traced. Lastly, inflation of the lung distends the condensed parts, and gives to them again, more or less completely, their natural physiological characters.

MM. Rilliet and Barthez, in their second edition, treat, at considerable length, of congestion of the lung as a very constant accompaniment, and as a very important element in the state of collapse. They regard this congestion as being connected nearly always with bronchitic inflammation, and as being not merely a passive state, but as exhibiting phenomena, in most instances, which prove it to be in some degree an active condition. They say (*loc. cit.*, t. i, p. 428): "We readily acknowledge that a state of debility, prolonged dorsal decubitus, and the obstruction to the circulation thus occasioned, facilitate the production of this condition, and give to it the appearance of a simple passive congestion. But we believe that there exists, moreover (frequently, if not always), a really active and even inflammatory movement." They regard this opinion as proved chiefly by the fact that they have found the texture of the affected parts to be somewhat softened, as shown by the facility with which they are torn by the finger or by scraping with a scalpel; by the swelled and turgid condition the tissues exhibit; by the quantity of sanguineous or sero-sanguineous liquid which escapes on pressure; and by the presence of a serous exudation around the pulmonary vesicles, while the interior of the vesicles appears to be healthy. The last-mentioned condition they found upon their own observation, and upon a microscopic examination made by M. Lebert.

The color is different in the two alterations, being, in collapse, purple or livid, and, in pneumonia, brownish-red or fallow-red. In pneumonia the pleura covering the hepatized portions is often covered with false membrane, showing thereby the inflammatory nature of the disease; in collapse this is rarely the case, and only when there is some accidental concomitant pneumonia. The density of the lung in the two conditions is of a different kind: in pneumonia it is hard to the touch, and unyielding; in collapse it always retains a certain degree of flaccidity and softness, like that of muscular tissue. In pneumonia the diseased part is turgid and swelled, so that it projects above the common level of the surrounding surface; in collapse, on the contrary, it is shrunken and depressed below the neighboring parts. In pneumonia the effects of the inflammatory process on the tissues is very strongly marked, and produces changes in them very different from those occasioned by mere collapse. In the former disease the cohesive properties of the pulmonary structure are very much lessened, so that the inflamed parts are readily penetrated by the finger, and are easily torn; in simple collapse, on the contrary, the diseased part is as firm and resisting, or even more so, than in health; whilst in collapse occurring in bronchitis and attended with congestion, though the cohesion of the tissues is somewhat lessened, it is never nearly so much so as in pneumonia. In the true hepatization of pneumonia, a cut surface always presents a granular aspect, while in collapse, on the contrary, it is smooth and even. On scraping a cut surface it is found that, in the former alteration, a plastic, fibrinous matter, of a yellowish, orange, or gray color, comes off on the knife; while, in collapse, only some semi-transparent bloody serosity is scraped off. In the former, the anatomical arrangement of the lobules cannot be seen, as the inflammation attacks indifferently the lobules themselves, the interlobular septa, and parts of neighboring lobules; but, in the latter, the alteration can always be seen to be more or less regularly confined to the lobules, the cellular interstices between the lobules remaining more or less apparent; so that in pneumonia the alteration is not bounded at all by the outlines of the lobules, while in collapse the alteration always affects, more or less, the lobular form. To conclude, the effects of inflation are altogether different in the two conditions. M. Legendre (*Recherches Anatom.-Path. et Clin. sur quelques Mal de l'Enfance*, p. 164) states that air can never be made to penetrate by inflation into a completely hepatized lung. Neither in hepatization of the lobar form, nor in true partial hepatization, has he ever been able, even with the utmost effort, to push air into the inflamed tissues. After repeated trials, the tissue remained compact and friable, and sank as rapidly as before when thrown into water. In the fœtal state, on the contrary, the slightest effort sufficed to fill and distend the collapsed air-cells, and to give to the altered portion its natural appearance, excepting that it became more red in consequence of the oxygenation of blood contained in the capillaries. Dr. Gairdner (*Pathol. Anat. of Bronchitis, etc., Edinburgh*, 1850, pp. 13, 14) remarks that, though this test "is very useful in demonstrating the nature of the lesion, in a favorable case, to one not familiar with its character, I do not believe it to be applicable to the determination of the presence or absence of pneumonia in those mixed cases in which alone there is any difficulty." He has observed, in fact, that partially pneumonic lung may be inflated when the affection is recent and combined, as it frequently is, with bronchitic collapse, while in the latter lesion, in its purest forms, complete inflation is often very difficult or impossible after the collapsed state has been of some duration.

The part of the lung in which collapse is most frequently met with, depends somewhat on the form of the alteration. In the diffused variety, it may affect a more or less considerable portion of either or both lungs, but is most common at their posterior part. The lobular variety is most common on the anterior edges, but may, like the diffused, occur in any other part. As a general rule, the alteration is most frequent at the periphery of the organ, where its edges are thin, as along the margins of the lobes, in the languette of the upper lobes, and at the bases of both lungs. The parts just named are those most distant from the primary air-passages; they are those in which the inspired air would arrive last and with the least force of impulsion.

CAUSES.—It has been generally acknowledged that there are two principal causes by which to explain the production of collapse of the lung. These are the presence in the bronchia of some condition which acts as an impediment to the ready passage of the inspired air, and a want of power in the muscular apparatus by which the function of respiration is carried on. To these Dr. Gairdner adds another,—the inability to cough and expectorate, and thus remove the obstructing mucus,—but this is, in fact, included in the preceding.

The most important of the above-mentioned causes is evidently the deficient respiratory power, since this is noticed and insisted upon by all observers. It has been found, in fact, that collapse seldom occurs to any considerable extent except in children who are exhausted and debilitated. The debility may be congenital, it may be the result of wearing diseases, as diarrhœa, hooping-cough, measles, typhoid fever, &c., or it may depend on exposure to unwholesome and enfeebling hygienic conditions. It is easy to understand that a child who is either born weak and feeble, or who becomes so in after years from any of the causes just alluded to, must lose, with the general decay of the strength of the body, some portion of the muscular power by which alone a complete and efficient dilatation of the thoracic cavity can be accomplished, and that, when this is the case, the inspirations must be short and imperfect, and that portions of the lung most distant from the primary air-passages, not being reached by the inspired air, will remain in an unexpanded or collapsed state. If we add to this state of feeble respiratory power, the presence of opposing secretions in the air-tubes, whether these be the consequence of bronchial inflammation, as they are in the immense majority of cases, or, as Dr. Gairdner suggests they may sometimes be, the mere natural secretion of these tubes, accumulated for the want of power to throw them off, it becomes abundantly easy to comprehend the mode of production of collapse, in at least some of the examples.

Whether a simple deficiency of inspiratory force alone, without obstructing mucus in the bronchia, will give rise to collapse, is a somewhat mooted point. Dr. West agrees with MM. Legendre and Bailly, in the opinion that it is often due to the inspiratory power having been inadequate to overcome that natural elasticity of the lung which opposes a full dilatation of the organ. Dr. Gairdner (*loc. cit.*, p. 33) cannot "see reason to believe with Dr. West, that mere debility, apart from any obstruction in the tubes, is a sufficient cause for collapse in the child." He remarks, and with strong show of reason, that the very fact of the lesion being usually more or less lobular, or partial in its distribution, appears to indicate special circumstances of a local kind, as having a marked influence on the production of this affection. What is of most consequence, however, to the working physician, as an important practical truth, is the fact stated by several observers, and adverted to by Dr. Gairdner himself, that in some cases no signs whatever of obstructive bronchitis or of bronchial accumulation can be discovered during life. Before leaving this point, we desire to call attention to the opinion of Hasse (*Pathol. Anat.*, Syd. Soc. ed., p. 253), that, though this partial introduction of air might be deemed at variance with the laws of respiration, inasmuch as the atmospheric pressure must necessarily distend the entire lung equally, not to the exclusion of a lobe, and still less, to that of a lobule, the objection falls to the ground when it is considered that the operation of these laws is the result of previous muscular action. He refers to the fact that in pleurisy one-half of the thorax, and in partial pleurisy certain portions of that cavity, do not share at all in the movements of the remainder. "We need, therefore," he says, "be at no loss to understand how defective breathing may originate in a merely partial activity of the intercostal or other respiratory muscles."

Dr. Gairdner, as already stated, considers as one of the causes of collapse, an inability to cough and expectorate, and thus to remove the obstructing mucus. The views which he expresses on this point are very interesting, and also, we think, very important. He states that Laennec supposed the expiratory force of respiration to be weaker than the inspiratory, while in fact the experiments of Hutchinson and Mendelsohn, to which he refers, prove that though *ordinary* inspiration is more of a muscular act than *ordinary* expiration, yet the residual effective force for overcoming adventitious obstruction is very considerably greater in expiration. "The *forced* or *muscular* expiratory act is, in fact, about one-third more powerful, as measured by its effect upon a pressure-gauge, than the extreme force of inspiration; and it is this force which is thrown into action when obstruction in the tubes is to be overcome." In the act of coughing, the air in the vesicles is brought to bear upon the obstructing substance within the bronchia, at a maximum amount of outward pressure, and with the additional mechanical advantage of a sudden impulse, so that the practical efficiency of the expiration in forcing air through obstructions must be far greater than that of inspiration. It is clear, therefore, that if the secretions in the air-passages be so abundant or so viscid as to interfere materially with the entrance and exit of air, they must necessarily occasion collapse, either partial or total, of the parts beyond them, since not only does the air enter with difficulty, but being expelled with greater force and in larger quantity than it can be drawn in, the amount remaining in the vesicular structure must gradually diminish. This effect of obstruction will be still more remarkable when the muscular force of respiration is diminished by debility of the patient, for then the inability of the inspiratory act to replace the air driven out by expiration, will be yet more marked than when the muscular powers of the body retain their full force.

There is still another mechanical condition which tends to produce collapse from obstruction, to which Dr. Gairdner refers. This condition is to be found in the form of the bronchial tubes. These tubes are a series of gradually diminishing cylinders, and if a plug of any kind, but especially one closely adapted to the shape of the cylinders, and possessing considerable tenacity, be lodged in any portion of such a cylinder, it will move with much more difficulty towards the smaller end, and in doing so will close up the tapering tube much more tightly against the passage of air, than when moved in the opposite direction into a wider space. From this arrangement of the parts, it will happen that at every expiration a portion of air will be expelled, which, in inspiration, is not restored, owing in part to the comparative weakness of the inspiratory force, and in part to the valvular action of the plug. "If cough supervene, the plug may be entirely dislodged from its position, or expectorated, the air, of course, returning freely into the obstructed part; but if the expiratory force is only sufficient slightly to displace the plug, so as to allow of the outward passage of air, the inspiration will again bring it back to its former position, and the repetition of this process must, after a time, end in perfect collapse of the portion of lung usually fed with air by the obstructed bronchus."

We have been thus particular in our consideration of the causes of collapse, because we are convinced, from personal observation, that it is a subject of very great importance in practice. Many times, in the last few years, we have met with cases of bronchitis, either primary or secondary, in weak and debilitated children, in which the general and local symptoms have pointed clearly to the existence of collapse of the lung, and in which, moreover, the good effects of a sustaining and even stimulating treatment have shown the great utility of an acquaintance with the nature of this affection, and its proper remedies.

Symptoms.—As collapse of the lung occurs almost always in connection with bronchitis, though sometimes, also, after, or concomitantly with pneumonia, it is clear that the symptoms which reveal its existence must be mingled, in a greater or less degree, with those of the two diseases just named. It is true, nevertheless, that it sometimes occurs unassociated with more than very slight evidences of any other disease of the lung. Cases of the latter kind have been usually observed only in children dying in states of utter exhaustion, in whom the muscular power of respiration has been so greatly weakened, as to prevent a dilatation of the thoracic cavity sufficient to carry air into the deeper parts of the lung. In such instances, the symptoms of collapse do not show themselves until a very short time before death, and they consist in the sudden appearance of very rapid and oppressed breathing, with little or no cough, in more or less extensive dulness on percussion over different parts of the chest, but most commonly the inferior dorsal regions, and in feeble or suppressed respiratory murmur, or more commonly a distant and imperfect bronchial respiration. In some cases, however, in which there is very little bronchial complication, as shown by the rarity and small amount of the catarrhal râles, the symptoms of collapse continue with more or less irregularity, as to situation and extent, for periods of several weeks, or even months. But here, also, as in the cases previously referred to, the general debility and low health of the child are strongly marked, and are, with slight variations, persistent. As an instance of this kind of collapse, we may cite the following case, which occurred in the practice of one of ourselves:

A boy, between three and four months old, who, at birth, and up to the time of this attack, had presented every appearance of strong and vigorous health, was seized, on the 3d of October, 1849, with symptoms of a somewhat irregular and anomalous character, but which we soon suspected to be the signs of an intermittent fever. We were induced in part to make this diagnosis, from the fact of having attended the mother during her gestation of this child, in a severe attack of intermittent fever. At the beginning of the sickness, there was some little coryza, but no cough whatever. On the 3d of October, after the coryza had lasted for a few days, he became worse, and we were sent for. During the six days following this, he had one or two attacks each day of coldness of the extremities, followed by violent fever, and ending sometimes with perspiration. He was exceedingly fretful, screamed a great deal, was at times drowsy and dull, and vomited occasionally. The stools were regular and perfectly natural. The breathing was rapid and short nearly all the time, but there was no cough whatever. On the seventh day, the respiration was 100 by the watch, and irregular. The child was pale, weak, drowsy, and entirely without cough. Percussion revealed nothing, and no râles could be heard. On the eighth day, the breathing was 96, and a slight, dry cough was heard two or three times. When roused up, the intelligence of the child seemed perfect. On the ninth day, the breathing was 63, and the pulse 120. There was rather more cough, though still very little, and there was a slight return of the coryza, of which there had been none for several days before. Neither auscultation nor percussion revealed any decided change in the lungs. On the eleventh day, the paroxysms of chilliness, followed by fever, were still noticeable, though there was no clearly marked periodicity in the returns. When without fever the breathing was 54; during the fever it was 67. Auscultation revealed nothing decided. Percussion showed dulness beneath the right clavicle. By the seventeenth day, the intermittent nature of the disorder was more decidedly marked, and under a few doses of quinine the symptoms had improved, so that the breathing fell to 30 during sleep. The cough was a little more frequent, though still very slight, and it was loose. The coryza, also, was more considerable, the nasal discharge being quite abundant.

After this the case went on badly, owing, we think, in great measure, to the circumstance of the quinine being abandoned in consequence of the opposition made by the parents to its administration,—an opposition which we allowed to influence us more than was proper. During November and December, the child remained weak, pale, languid, and with uncertain appetite, sometimes refusing the breast for a whole day at a time. The quinine was suspended at first on account of the great improvement which had taken place in the symptoms, and though resumed afterwards, was given in such small quantities, and for so short a time, for the reasons just mentioned, as to be of no service. In December the child was very ill. It looked badly, having a pale, waxy face, and a dull, languid expression, though without any want of intelligence; it emaciated moderately, and had occasional vomiting; the stools were natural. At this time also it took the mother's breast with some difficulty, and refused artificial food altogether. Occasionally during this month there was observed a slight blueness around the mouth, and also about the hands and feet. Late in the month it was attacked with thrush in a slight degree, which lasted several days. In the first week of January, finding that it was fast sinking from refusing the mother's breast and artificial food, a wet-nurse was procured, and for a few days it seemed to improve a little, but this did not last. It grew weaker and thinner, the thrush returned, it had now a good deal of loose cough, the abdomen became somewhat contracted and felt hard and doughy, and the breathing was very rapid, though not greatly oppressed. The child died at last on the 26th of January, having, for ten days before that event, looked wretchedly languid and haggard, and having presented for three days before, slight diarrhœa, loose, frequent cough, entire loss of appetite, thrush, drowsiness, and, finally, coma.

At the autopsy there were found some fibrinous exudation, and a few adhesions over the lower half of the left lung. The lower two-thirds of the left and the lower half of the right lung were dark-colored, more dense than usual, not friable, and exhibited no granulations on a cut surface. These portions were in fact collapsed. The upper lobes were spongy, crepitant, and healthy. Not a tubercle was found. The foramen ovale presented an oval-shaped opening, of the size of a goose-quill. The abdominal organs were healthy.

When, as indeed most usually happens, collapse occurs in the course of bronchitis, it is associated of course with the symptoms of that disease. The bronchitic symptoms have lasted in their usual form for several days, having been marked by sonorous, sibilant, and subcrepitant râles, when suddenly, or in the space of a few hours, the breathing becomes much worse, the pulse rises in frequency but becomes small and feeble, and certain changes take place in the physical signs which are very important. The subcrepitant râle continues to be heard, but it is associated now with prolonged expiration, and a little later with bronchial respiration, which, however, is of a different kind from the bronchial respiration of pneumonia, being distant and smothered, instead of near and metallic, as in that disease. The percussion becomes, at the same time, dull and obscure, but never, scarcely, to the same extent as in pneumonia. The general symptoms are those of exhaustion, rather than of high reaction. The surface is pale or slightly bluish, the skin is either natural in temperature, slightly warmer than usual, or coolish, the strength is very much reduced, and the child appears more seriously ill, and particularly more oppressed than the amount of bronchitis present would seem to explain.

As an example of collapse occurring in the course of bronchitis, we will give the following case. A girl between two and three months old, healthy when born and up to the time of this sickness, saving that she was rather paler and smaller than most robust infants, was seized with coryza and slight cough, and after a few days with the symptoms of a mild bronchitis. For two days there was frequent cough, some little fever, quick but not oppressed breathing, occasional sibilant and mucous râle, perfect ability to nurse, and very moderate restlessness or fretfulness. On the third day, without any apparent reason, the symptoms became suddenly very alarming. The breathing became extremely rapid and most violently oppressed, so that the movements of the chest at each respiration were heaving and laborious, the shoulders being lifted high at each inspiration, the outer angles of the mouth drawn downwards, and the alæ nasi widely dilated. There were at the same time abundant subcrepitant, intermingled with dry râles over the dorsum of the chest. In this case, moreover, the symptom mentioned by Dr. Rees was very well marked. The base of the chest was driven inwards at each inspiration, producing at that point an evident constriction, whilst the upper parts were lifted high in the effort to carry on the respiration. The cough was frequent and racking, and occurred in paroxysms. The child was still and quiet, pale, had a haggard and exhausted look, was unable to nurse at all, and its surface was cool and white, especially that of the extremities. These symptoms continued with very little modification for twenty-four hours, when, under the use of brandy, administered every hour in milk drawn from the mother, of the spirit of Mindererus and paregoric perfect quiet, and the assiduous employment of mild revellents, they began to moderate, and at the end of another twenty-four hours the constriction at the base of the thorax during inspiration had disappeared, the breathing was easy and gentle, the extremities had become warm, the child nursed eagerly and abundantly, and, with the exception of a slight catarrh, which lasted a few days longer, it was well.

Collapse depending on bronchitic inflammation, in debilitated children, may sometimes last a considerable length of time. In one case, indeed, that we saw a few years since, and of which an account was published (see *Am. Journ. Med. Sci.* for January, 1852, p. 98), the symptoms, owing probably to the fact that the bronchitis causing the collapse, was an accompaniment of hooping-cough, continued with slight variations in degree, for a period of about three months, after which the child entirely recovered.

DIAGNOSIS.—The diagnosis of collapse of the lung must always be more or less uncertain where it is of the lobular form, for the reason that the collapsed lobules being disseminated irregularly through the pulmonary tissue, afford no physical sign by which we can detect their condition. The presence of this form ought, however, to be suspected whenever, in a chronic disease, and especially in the course of a catarrhal attack occurring in a feeble and debilitated child, the breathing becomes excessively quick and labored, the skin pale and coolish, when the base of the thorax presents a depression instead of an expansion during inspiration, and, especially, when these symptoms occur without there being a sufficiently severe and extensive bronchitis to explain their existence.

In cases of collapse affecting a considerable or the greater part of a lobe, the diagnosis, though still perhaps rather uncertain, is much more clear and positive than in the lobular form. In the latter form we are obliged to depend, indeed, almost exclusively upon the rational symptoms, the physical signs being either very slight or entirely null. In collapse of considerable portions of the lung-tissue, we have, on the contrary, some very useful physical signs. These are, the existence of dulness, greater or less, on percussion; feeble respiratory murmur; prolonged expiratory sound, and sometimes bronchial respiration; which, when they occur in connection with, and in the course of bronchitis, are usually quite sufficient to render the diagnosis easy.

The only diseases with which collapse, presenting the physical signs just mentioned, could be confounded, are pneumonia and pleurisy. From both of these it is usually distinguishable by the absence in collapse, or the slight severity, of the reactional symptoms, by the paleness or blueness and coolness of the surface, by the absence of acute pain, by the greater severity in collapse of the bronchitic symptoms, and by the fact that it rarely occurs except in enfeebled, broken-down subjects, or in those laboring under severe bronchitis. The character of the physical signs, moreover, is different. Though we have dulness on percussion in collapse, it is not so absolute as that either of pleurisy with large effusion, or that of confirmed pneumonia. The bronchial respiration, too, is in collapse, different from that of pneumonia. It is muffled and distant, instead of being clear, metallic, and close under the ear, as in pneumonia: and is heard, too, much more in the expiration than in inspiration. In collapse there is also heard, unlike either pneumonia or pleurisy, an abundant subcrepitant râle. To add to these differences, it is proper to say that, in cases of pneumonia and pleurisy, the course of the disease is much more regular, and the special symptoms so well marked as to leave no doubt as to the real nature of the attack.

PROGNOSIS.—The prognosis of collapse must depend, in great measure, on two circumstances—the amount of bronchitis which accompanies it, and the constitutional state of the child. When it occurs during the course of extensive bronchitis, as shown by a great abundance and extent of the bronchitic râles, it must add greatly to the danger of that disease; and if, at the same time, the child be weak and debilitated, either from causes long previously in action, or from the severity of the present attack, the risk to life is very great indeed. Collapse is dangerous, also, but far from necessarily fatal, in subjects in whom its chief cause has been simple debility. The possibility and the probability of recovery will depend on the hygienic conditions to which the child is exposed, the degree of vital strength it is likely to inherit from its parents, the extent of the collapse, as indicated by the severity of the thoracic symptoms, both rational and physical, and the effects of treatment. When the subject can be placed under favorable hygienic conditions, when it has inherited from its parents a good and vigorous hold on life, and when the symptoms of collapse are not very violent, a proper and rational treatment will in all probability save it, while, under opposite circumstances, the chance of recovery would be very small, if there were any.

TREATMENT.—The treatment of collapse, or post-natal atelectasis, must vary somewhat in different cases. One general rule will apply, however, to all; that is to employ a sustaining and strengthening system of medication, to the exclusion of all exhausting means.

In cases which are entirely, or almost entirely, independent of bronchitis, the most important measures to be attended to are the regulation of the temperature in which the child is kept, of the clothing, and of the diet, the use of mild stimulants and of tonics, and the external employment of revellents. The child ought to be kept in a warm, even temperature, one from 70° to 75°; it should be clothed in soft flannels, and its diet ought to be nourishing and strengthening. If at the breast, we should be sure that the milk is of a good quality, and that the nurse has an abundant flow. If weaned recently, it ought to have, if possible, a wet-nurse, and so also if it be supposed that the mother has too little milk, or that this is not perfectly healthy. If permanently weaned, the diet should be so arranged as to give to the child what is at the same time easy of digestion and nutritious. In a severe case, coming on suddenly, the most suitable internal remedies are brandy, in small doses, frequently repeated, Huxham's tincture of bark, the spiritus Mindereri or the aromatic spirits of hartshorn, and small doses of quinine or extract of cinchona. In slower and more chronic cases, we must depend on a well-selected and nutritious diet (and food ought to be given almost by force, or at least it should be urged strongly on the child), on warm clothing, and on the use internally of brandy, quinine, the citrate of iron and quinine, pure metallic iron, the iodide of iron, Huxham's tincture of bark, or some such remedy. In sudden cases, the best revellents are the following: mustard weakened by admixture of flour or Indian meal, and applied once in three or four hours; a plaster made of suet or simple cerate grated over with nutmeg; or liniments composed of ammonia, spirit of turpentine, or oil of amber, mixed with sweet oil. In chronic cases, the Burgundy pitch, or compound Galbanum plaster, made somewhat weaker than those used for adults, should be applied over the front and back of the chest, or we may rub the thorax twice a day with any ordinary ammonia liniment, made, if necessary, rather more irritating than usual by the addition of some oil of monarda. The daily use of a gentle emetic of ipecacuanha has been recommended, and supposed to prove useful, by emptying the bronchia of their secretions, and also by the fact that its operation induces several deep inspirations, and in that mode promotes the better performance of the respiratory act. We have never employed the emetic except in cases accompanied with a good deal of bronchitis and consequent accumulation of mucus in the air-tubes, and not then when the prostration was very great. In fact, the operation of any emetic is sometimes productive of so much exhaustion of the strength, as to cause us to hesitate in prescribing a remedy of that class; though we can fully understand that the act of vomiting, if not followed by too much prostration, could scarcely fail to prove beneficial in collapse, by the strong efforts at breathing which it gives rise to, and also by the succussions it must impart to the lungs through the medium of the diaphragm.

In cases of collapse occurring in the course of, or towards the termination of severe bronchitis, the treatment must resemble a good deal that which we have just described as proper for the same condition, when it exists unassociated, or associated only to a slight extent, with that disease. When the symptoms of imperfect expansion appear towards the termination of, or after the patient has partially recovered from bronchitis, and when of course the strength is more or less reduced by the severity of the previous acute sickness, and also perhaps by the necessary measures of treatment, the case ought to be managed very much in the same way as has just been recommended for those in which the collapse was caused chiefly by exhaustion, and less by the presence of obstructing secretions in the bronchia. Nourishing, but very light and digestible food; mild stimulants, as small quantities of brandy or wine-whey; the bitter tinctures, iron, or quinine, with counter-irritants to the surface of the chest, warm clothing, and repose, constitute the necessary and most reasonable remedies. When, on the contrary, the atelectasial condition supervenes in the midst of extensive and severe bronchitis, we are called upon to treat at the same moment two morbid states, one consisting of active inflammation, and another of want of power in the muscles of respiration to force the atmospheric air through the secretions which are obstructing the air-passages. Under these circumstances, there is almost always associated with the bronchitis, as we shall find when we come to treat of that disease, more or less intense congestion of the collapsed portions of the lungs. We must employ, therefore, such remedies as tend to modify the inflammation of the bronchial mucous membrane, and diminish thereby the amount of secretion poured into the air-passages; such as may serve to expel mechanically those secretions; and those which shall unload the congested lung of its excess of blood, always taking care, in our selection of the agents to accomplish these ends, to choose those which are the least perturbative and exhausting. To moderate the inflammation of the bronchial mucous membrane, we may employ dry cupping, or, if the patient be not too much reduced, wet cupping or leeching, but these latter with great moderation. For the same purpose, and with a view also to unload the congested parts of the lung, counter-irritation is very important, and the best mode of effecting this is by the repeated application of dry cups, or of mustard poultices, consisting of one-third mustard to two-thirds Indian meal or flour, and by mustard foot-baths. These poultices ought to be applied first to the dorsum and then to the front of the chest, once in every three or four hours, and they should be made large enough to cover a considerable portion of the thoracic walls. Counter-irritation, assiduously made use of, is, we believe, one of the most, if not the most effectual means of treatment in the case. Emetics ought to be given twice a day, or even three times, if they do not reduce the strength too much. The best are those which operate with the least subsequent prostration, such as ipecacuanha or alum. When they are found to exhaust much, and to increase thereby the labor of breathing, their use must be suspended.

After emetics, or when these cannot be used, the remedies from which we have obtained the greatest benefit are the liq. ammon. acetat., and seneka, either in decoction or syrup, combined sometimes with small quantities of opium. To a child two years old we should give twenty drops of the acetate of ammonia solution, with ten of the syrup of seneka, or with a teaspoonful of decoction of seneka, every two hours. When the cough is paroxysmal, painful, and harassing, about ten drops of paregoric, half a drop or a drop of laudanum, or from four to six drops of solution of morphia, may be added to each dose of the spiritus Mindereri and seneka. The opiate ought to be continued until the cough and restlessness diminish, and then be suspended. In all these cases, there should be no hesitation in giving small quantities of brandy or wine-whey, whenever the symptoms of prostration are so marked as to indicate immediate danger; when the pulse is very rapid and small, when the skin is cool or pale and bluish, and when the general aspect of the patient, and the convulsive and labored character of the breathing, show that the muscular strength of the child is scarcely sufficient to carry on the function of respiration.

## ARTICLE II.

### PNEUMONIA.

DEFINITION; SYNONYMES; FREQUENCY; FORMS.—The term pneumonia is now, by universal consent, applied only to inflammation of the parenchymatous structure of the lungs. It is often called, in this country, catarrh-fever, lung-fever, or inflammation of the lungs.

It is one of the most frequent, and, therefore, one of the most important of the acute diseases of childhood. Dr. West, in a paper on the pneumonia of children (*Brit. and For. Med. Rev.*, April, 1843) informs us that the English tables of mortality show pneumonia to be the cause of a larger number of deaths in childhood, than any other disease, with the exception of the exanthemata. From the third report of the Registrar-General, he quotes the facts, that of all the deaths in the metropolitan districts under fifteen years of age, 13.6 per cent. were from pneumonia, 13.0 per cent. from convulsions, and 5.4 per cent. from hydrocephalus. He obtained nearly similar results from an examination of the returns from Manchester, Liverpool, and Birmingham.

In this city it appears from the bills of mortality that the deaths from this disease are strikingly below the percentage calculated by Dr. West. Thus, during the past seven years, the total mortality from all causes (excluding still-born children) was, at all ages, 105,785; under fifteen years of age, 50,151; and under five years, 43,322. The total mortality from pneumonia during the same period was, at all ages, 5567, or 5.26 per cent. of the entire mortality; under fifteen years, 2985, or 5.95 per cent. of the mortality under that age; and under five years, 2746, or 6.33 per cent. of the mortality under that age. During the same series of years, the total mortality from bronchitis was, at all ages, 969, or less than 1 per cent. of the entire mortality; under the age of fifteen years, 509, or 1.01 per cent. of the mortality under that age; and under the age of five years, 495 or 1.14 per cent. of the mortality during the first five years of life.

Any one who will study with attention the various doctrines in regard to pneumonia and bronchitis that have been set forth in the different works on the diseases of children, will most assuredly acknowledge that there are few diseases about which there has prevailed so much diversity of opinion as to the real nature of the lesions forming the essential anatomical characters of the disorder, and, as a consequence of this, so much doubt as to the proper mode of classifying and describing them. From the time of the appearance of the works of M. Valleix, M. Barrier, Dr. Gerhard, and especially that of MM. Rilliet and Barthez, up to the moment of publication of the essay of MM. Legendre and Bailly (referred to in the article on atelectasis), it was commonly believed that inflammation of the parenchyma of the lung exhibited in children very different characters in the majority of the cases, from those which marked the pneumonia of the adult. Two principal forms of the disease were therefore described by most writers,—the *lobular* and the *lobar*. The former was supposed to be almost peculiar to children, and to occur only on rare occasions in adults; the latter was held to resemble, in almost every respect, the pulmonic inflammation of the adult. Moreover, lobular pneumonia was generally believed to be by far the most common form assumed by the inflammation in children under five years of age, whilst lobar pneumonia was thought to be comparatively rare under the age mentioned. Besides these two chief varieties of pneumonia, two others have been described under the names of *vesicular* and *marginal* pneumonia, while to yet another MM. Rilliet and Barthez applied the title of *carnification*.

The researches of MM. Legendre and Bailly have caused a great revolution in the views of a large number of medical observers and writers. These authors first pointed out (as stated in the article on atelectasis) that a very large proportion of the cases previously described under the titles of lobular pneumonia, generalized lobular pneumonia, pseudo-lobar pneumonia, marginal pneumonia, and the carnification of MM. Rilliet and Barthez, were in fact cases of bronchitis variously associated with congestion and collapse of the tissue of the lung. They themselves described these supposed different forms of pneumonia under the title of *catarrhal pneumonia*. But, though they were opposed to the opinion of lobular pneumonia being a true inflammation of the lung, they did not assert that children were not subject, like adults, to regular inflammation of the pulmonary parenchyma. They described, in fact, as nearly all others have done, a *lobar* pneumonia, which exhibits the same anatomical characters, and very nearly the same train of symptoms, both rational and physical, as the pneumonia of adult life; and a *partial* pneumonia, in which the inflammation, instead of invading a large part of a lobe or a whole lobe, attacks isolated small portions of the parenchyma, so as to present an appearance of nodules of inflammation scattered here and there through the healthy tissue.

Since the publication, in 1844, of the views arrived at by MM. Legendre and Bailly, numerous other observers have repeated and continued their researches, but with very different results. Some have adopted their opinions entirely, others in part, while a few still adhere tenaciously to the old doctrines. Amongst those who now believe that lobular pneumonia in its different forms is in fact bronchitis with collapse of the lung-tissue, and not inflammation of the pulmonary parenchyma, the most important are Drs. West and W. T. Gairdner (*loc. cit.*), MM. Hardy and Behier (*Pathol. Int.*, t. ii, p. 529, *et seq.*), MM. Rilliet and Barthez, in their second edition, and Dr. Fuchs (*Brit. and For. Med.-Chirurg. Rev.*, July, 1850, p. 154, *et seq.*). Amongst those who oppose the new views, we may mention the names of M. Bouchut and those of the authors of the *Compendium de Médecine Pratique.* We would refer any one who desires to study this matter as treated by English hands to the essay *On the Pathological Anatomy of Bronchitis, and the Diseases of the Lung connected with Bronchial Obstruction*, by Dr. W. T. Gairdner, of Edinburgh. It is decidedly the best English work on the subject we have seen, for it treats not only of atelectasia in children, but contains yet more numerous observations upon the same condition as it occurs in adults. The second edition of MM. Rilliet and Barthez is also very full on this subject, those authors adopting in great measure, as above stated, the views of MM. Legendre and Bailly.

Our own opportunities for investigating this interesting subject by post-mortem examination have been comparatively few, so that we have been obliged to form our conclusions in regard to it chiefly from a study of the researches of others, and from a comparison of the symptoms which we have observed during life in the different pulmonary affections of children, with those researches, and with the results we have obtained from the few autopsies that we have been able to make. Assisted by these combined means of forming a conclusion upon the subject, we have been led to the belief that the former method of dividing the pneumonia of children into the two forms of lobular and lobar is incorrect, and we have determined to substitute for the term lobular that of *partial*, which is the one employed by M. Legendre and also by Dr. Alois Bednar (*Die Krankheiten der Neugebornen und Säuglinge*, Dritter Thiel, Wien, 1852, p. 65), while we shall describe the other form of the disease under its usual title of *lobar*. Of these two forms, the latter is much the most frequent, though it was formerly thought that the lobular was more common than the lobar variety, simply from the fact that bronchitis attended with lobular collapse (the condition heretofore almost always described as lobular pneumonia) is much oftener met with in children than true pneumonia, either lobar or partial.

Predisposing Causes.—It is generally believed that pneumonia is most apt to occur in the course of other affections. This is certainly true in regard to the disease as it prevails in hospitals, and probably amongst the poorer classes of society also. MM. Rilliet and Barthez state that of two hundred and forty-five cases observed by themselves, only fifty-eight, or a little less than a fourth, occurred in children previously in good health. The proportion of secondary cases is much smaller in private practice, since of fifty-one cases of well-marked pneumonia, observed by ourselves, in which this point was noted, only six were secondary. No doubt one cause of this apparent discrepancy between the authors mentioned above and ourselves, is the fact that we have left out of consideration all the cases in which the pneumonic symptoms were not entirely clear, thus putting aside a number of cases which they would have classed as lobular pneumonia, but which we prefer to regard as examples of bronchitis with collapse. *Age* forms a strong predisposing influence. Of the two hundred and forty-five cases above quoted, one hundred and seventy-two occurred under five years of age. Dr. West (*loc. cit.*) says that during the first five years of life, the cases of pneumonia were in the proportion of 10.3 per cent. to the total of diseases, while in the succeeding five years they were in the proportion only of 1.3 per cent. The mortality bills of this city exhibit the same marked excess in the proportion of deaths from pneumonia under five years of age, as compared with the ensuing years. We have already seen that the proportion during the first five years of life is 6.33 per cent. of the entire mortality under that age; while during the ensuing ten years the deaths from pneumonia form but 3½ per cent. of the total mortality during that period of life. These statements do not agree with our own experience in private practice, since of fifty-five cases that we have seen in which this point was noted, twenty-eight occurred under five, and twenty-six between five and eleven years of age. showing that the frequency in the first five and the subsequent six years of life is very nearly the same. True pneumonia is less frequent in private practice in the first two, than in the succeeding years of life.

*Sex.*—A larger number of cases occur in boys than girls. The excess is probably not more, however, than may be accounted for by the preponderance of male over female children. Of fifty-five cases in which we have noted the sex, thirty occurred in boys, and twenty-five in girls.

*Constitution.*—It is doubtful whether constitution has much or any influence upon the liability to the disease. Dr. West says that weak health is not a predisposing cause, according to his experience. We are convinced that it attacks strong and vigorous children more frequently than those of more delicate constitution. In children of feeble health and weak stamina, the very same causes which produce pneumonia in the robust, give rise to bronchitis.

*Season.*—The disease is most prevalent during the winter and early spring months, as will be seen from the accompanying table, in which is shown the mean monthly mortality in Philadelphia, for the past seven years, from this disease, as well as from bronchitis. From this it will be seen that in December, January, February, and March (and the same is very nearly true of April also), the deaths from these diseases are three times as numerous as in August.

| Months. | Mean monthly mortality for 7 years, from Pneumonia and Bronchitis. | | Mean total mortality from all causes (including still-born) for 7 years. | Mean monthly percentage for 7 years, from Pneumonia and Bronchitis. | Mean monthly temperature (F.) for 7 years. |
|---|---|---|---|---|---|
| January, . . | Pneumonia, | . 46 | 1296.71 | 3.54 | 30.87° |
| | Bronchitis, | . 6.29 | | 0.48 | |
| February, . | Pneumonia, | . 45.57 | 1206.71 | 3.76 | 33.89° |
| | Bronchitis, | . 8.43 | | 0.69 | |
| March, . . . | Pneumonia, | . 48.57 | 1344.29 | 3.61 | 40.85° |
| | Bronchitis, | . 7.14 | | 0.53 | |
| April, . . . | Pneumonia, | . 41.57 | 1281.14 | 3 24 | 52.27° |
| | Bronchitis, | . 5.71 | | 0.44 | |
| May, . . . . | Pneumonia, | . 34.76 | 1234.29 | 2 81 | 62.77° |
| | Bronchitis, | . 6.57 | | 0.53 | |
| June, . . . . | Pneumonia, | . 26.14 | 1178.14 | 2.21 | 71.97° |
| | Bronchitis, | . 5.00 | | 0.42 | |
| July, . . . . | Pneumonia, | . 24.14 | 1837.00 | 1.31 | 77.71° |
| | Bronchitis, | . 4.00 | | 0.21 | |
| August, . . | Pneumonia, | . 20.14 | 1825.43 | 1.10 | 76.62° |
| | Bronchitis, | . 3.00 | | 0.16 | |
| September, . | Pneumonia, | . 14.57 | 1215.43 | 1.19 | 68.31° |
| | Bronchitis, | . 5.29 | | 0.43 | |
| October, . . | Pneumonia, | . 22.43 | 1218.14 | 1.84 | 56.30° |
| | Bronchitis, | . 5.43 | | 0.44 | |
| November, | Pneumonia, | . 28.86 | 1052.14 | 2.74 | 46.68° |
| | Bronchitis, | . 5.71 | | 0.54 | |
| December, . | Pneumonia, | . 39.57 | 1191.00 | 3.32 | 34.74° |
| | Bronchitis, | . 8.14 | | 0.68 | |

We have also placed in parallel columns the mean percentage of mortality from these two diseases, and the mean monthly temperatures, in order to show the marked correspondence between the coldness of the weather and the frequency of pneumonia and bronchitis. It is evident, however, that there is another element, beside the mere temperature, in determining their frequency, since, in both February and March, more deaths occurred from these causes than in January, although this latter is the coldest month of the year. The additional element is undoubtedly to be found partly in the sudden atmospheric changes, and damp, raw days which are so frequent, in both February and March, in our latitude, and partly in the impaired vitality found in many children, as the result of the intense cold of the preceding months.

*Previous Diseases.*—It is apt to occur as a complication of all the diseases of children, and most frequently in measles, pertussis, typhoid fever, enteritis, and bilious remittent fever.

EXCITING CAUSES.—The continued action of some of the predisposing causes must be regarded as the exciting cause in the majority of the cases. External violence, as a severe fall, or a blow upon the chest, will sometimes act as an exciting cause. The action of *cold* is almost always alleged to be the immediate cause of the attack. M. Grisolle states that it is impossible to determine the exciting cause in more than a fourth of the cases, and that in nearly all of these it is cold.

ANATOMICAL LESIONS.—*Lobar* pneumonia in the child is marked by the same physical characters as in the adult. The three stages of the inflammation—engorgement, red hepatization, and gray hepatization—exhibit the same alterations of the tissues as in adult life. Moreover, the three stages occur with about the same frequency in early as in later life. Dr. West (*loc. cit.*, 2d ed., p. 189) shows that the third stage occurs very nearly as often in children as in adults, he having met with it in the former in the proportion of sixty-eight per cent., while M. Grisolle found it in seventy-two per cent. of the latter. The chief difference in the disease, as it exists at the two ages, consists in the more frequent coexistence of all three of the stages in the young subject.

In the first stage, or that of engorgement, the affected portion of lung is distended, so that it does not collapse in the same proportion as the healthy portions, when the thorax is opened. It is heavier than usual, so that it sinks somewhat in water; it is of a brownish-red color; it pits upon pressure, and crepitates less than healthy lung, the crepitation being observable only here and there. The natural degree of cohesion between the tissues is somewhat diminished, so that the diseased portion is much less tough and elastic, and more soft and friable than it ought to be. When cut into, a large quantity of frothy, and more or less deeply-tinged sanguineous fluid escapes.

In the second stage, or that of red hepatization, the lung is increased in volume, so that it continues to fill the side of the chest after that cavity is opened; it is dense and hard, has ceased entirely to crepitate, from the fact of having become completely impermeable to air, and sinks rapidly when thrown into water. Externally, the diseased portion is of a deep red color, while internally the same color is observed, but often of such different shades as to give to a cut surface a marbled aspect. The cohesion between the tissues is, in this stage, much less strong than in health or in the first stage of the disease; the finger penetrates the lung with some ease, and the texture can be crushed between the finger and thumb. When cut into, there escapes a non-aerated and reddish fluid, which is much less abundant than in the first stage. The most important feature of red hepatization is, however, the granular character of an incised surface. This granular appearance is produced by the presence of numerous minute flat granular elevations, which seem to consist of effused matter that has been thrown out in the air-vesicles. It is best seen by examining a torn surface of the lung.

In the third stage, or that of gray hepatization, the lung continues to exhibit the same volume, density, impermeability to air, and consequent total absence of crepitation, as in the second; but the process of softening has made still further progress, so that a portion of the lung may be squeezed with the greatest ease between the finger and thumb into a pulp. The color has now changed from deep-red to a dirty light-gray, or a pale straw-yellow. When incised, the surface still presents a granular appearance, but the granules are more irregular and flatter. The diseased portions are now infiltrated with a puruloid fluid, which escapes in considerable quantities in the form of a yellowish-gray liquid, whenever the lung is cut into.

The anatomical lesions, which characterize *partial pneumonia*, occur under two conditions. In one the alterations are exactly the same as those of the lobar form, the only difference between the two being that, in the partial form, the hepatization affects distinct patches of the pulmonary substance, producing, therefore, hard nodules of hepatization, scattered through healthy tissue. These nodules are irregular in form, and imperfectly circumscribed, but present, like the lobar form, the three stages of the inflammation,—engorgement, red hepatization, and gray hepatization. The second variety of partial pneumonia is characterized by patches of hepatization, varying in number from fifteen to thirty, and in size from that of a hemp-seed to that of a pigeon's egg, which are more or less spherical in shape, hard to the touch, and exactly limited. M. Legendre states that these hepatized points become transformed into a grayish, rough, and uneven substance, of a fibrous appearance; a change which takes place at different points of the diseased mass, sometimes in the centre only, sometimes in their whole extent, and at others on their circumference.

*Abscesses* are not very uncommon in the pneumonia of children. They occur as a result of the third stage of the disease, so that in the same lung may be observed the first, second, and third stages of the inflammation, and abscesses. The cavities of the abscesses are generally circular, sometimes oval, and they measure from half a line to an inch or more in diameter. Sometimes the abscess is multilocular, each of the purulent cavities being partially separated from its neighbor by a wall of hepatized tissue. They are found in various parts of the lung, but seem disposed, generally, to approach the surface of the organ. When the latter event happens, adhesive inflammation between the pulmonary and costal pleura usually takes place; but should this fail to occur, the abscess ruptures into the pleural sac, and produces pneumothorax. MM. Rilliet and Barthez met with two examples in their autopsies, in which this accident had occurred, and they report another case in which it occurred during life, and in which the child recovered. We have met with two cases of pneumothorax ourselves, produced in the same way. One occurred in a boy eleven years old, during an attack of secondary pneumonia complicating a severe bilious remittent fever. The patient recovered entirely, after a most violent illness. The other occurred in a very young child and proved fatal.

We are desirous, before closing our remarks on the anatomical lesions of the disease under consideration, of drawing attention to the subject of simple non-inflammatory congestion of the lung, for the reason that the latter has no doubt, especially when associated with collapse of the pulmonary tissue, been frequently mistaken for pneumonia.

*Congestion of the lung* occurs either in the lobular or lobar form, the distinction between the two being the same as that between lobular and diffused or lobar collapse. When lobular, the lung presents, generally along the posterior edge of the organ, disseminated lobules, distinctly circumscribed by the interlobular cellular septa, which are rather protuberant than depressed, more friable, and of a lighter purple color than collapsed lobules, and which afford, when squeezed, a considerable quantity of frothless bloody fluid. In very young infants, the congestive disposition often assumes the lobar or diffused form, and is supposed by M. Legendre to have frequently been taken for pneumonia. In this variety of congestion, the affected portion of the lung is increased in size, and is distended and gorged with fluids. The color of the congested part varies from a light to a dark purple, or almost blackish tint. The cohesion of the lung is also variable, the differences depending on the degree of the congestion. When this latter is very great, the part is very friable, while it is much less so under the opposite condition of things. Though the lung is harder in this state than natural, it still retains a certain degree of flaccidity which does not exist in true hepatization. Pressure causes an abundant exudation of blood and serosity from a cut surface, and the latter, instead of being granulated, as is always the case in hepatization, is smooth and even. Neither does the lung exhibit any granulations when it is torn. Lastly, inflation distends all the vesicles, and gives to the condensed parts their natural lightness, and their rosy color, though, be it remarked, the development of the affected parts under the operation is not complete and entire as in collapse, in consequence, no doubt, of the large amount of blood they contain.

Inflation of the lung after death has been much employed of late, as any one who has read the previous remarks on atelectasia must have seen, as a means of distinguishing between pneumonia and collapse. It was there stated that, whilst inflation distended, and restored more or less completely to their natural condition, parts of the lung that were merely collapsed, it failed almost entirely to have any effect on parts of the lung affected with true pneumonia. It is easy to understand why inflation should fail to exert much effect on inflamed lung, at least when the disease has reached the state of hepatization. In fact, the tissues comprising the lung are glued together and hardened by a deposit of plastic lymph, poured out chiefly on the inside of the air-cells, so that it becomes impossible to force the air into the midst of the agglutinated structures. In the first stage of pneumonia, that of congestion, inflation will distend in some degree the affected portions, but, in the second and third stages, not even the strongest force has any effect on the impermeable vesicles.

Lobar pneumonia is stated by most authorities to be generally confined to one lung, and such has been our own experience in regard to it, since of 56 cases in which its location was carefully determined, it was unilateral in 52, and double only in 4. It is much more common on the right than left side, according to most writers. In the 52 cases just referred to, the distribution was nearly equal, the disease being seated 29 times on the right side, and 23 times on the left. It attacks the lower lobe much more frequently than the upper. Of 51 cases in which this point was determined, the upper lobe was the part affected in 20, while in 31 the base of the lung was the seat of the disease. Of the 20 cases of inflammation of the upper lobe, in 13 it was seated on the right, and in 7 on the left side. Of 31 cases occurring in the lower lobes, 15 were on the right, and 16 on the left side. In the 4 cases of double pneumonia, the inflammation attacked the lower lobes of both lungs in one; in one the postero-inferior part of both upper lobes was especially involved;

while in the two others it attacked first the base of the left lung, and afterwards the summit of the right.

The statements just made as to the seat of the pneumonic inflammation in the cases that have come under our own observation, do not, we are well aware, agree exactly with the experience of other observers. Dr. West, for instance, found (*loc. cit.*, p. 190) that double pneumonia preponderated greatly, in early life, over those wherein only one lung suffered. This, it will be observed, is widely different from the result of our experience, and it is also directly opposed to that of MM. Rilliet and Barthez, Rufz, and Barrier. M. Barrier, in fact, cites (*Mal. de L'Enfance*, t. i, p. 286) 144 cases of lobar pneumonia as having been observed by the authors just mentioned, and by himself, and of these only 15 were double. Our results in regard to the frequency of double lobar pneumonia agree, therefore, with those of the authors last mentioned, but they differ as to the relative frequency with which the two lungs are attacked. Thus, in our cases, the inflammation occurred with nearly equal frequency in the two lungs, whilst of 129 cases of unilateral pneumonia observed by the above authors, 84 were seated in the right, and 45 in the left lung. These writers state, as most others do, that pneumonia of the lower lobe is more common than that of the upper lobe. This tallies with our observations, but, as it seems to be a general opinion in the profession, that inflammation of the summit of the lung is rare in comparison with that of the base, we wish to call attention again to the fact stated above, that of 51 cases, in which we ascertained accurately the seat of the disease, it was in the upper lobe in 20, and in the lower in 31.

It was formerly supposed that *bronchitis* was an exceedingly frequent accompaniment of pneumonia, and there is no doubt that such is really the fact in a much larger proportion of the cases that occur in children, than of those that occur in adults. But, since the discovery of the nature of the anatomical alteration, which we have described under the title of collapse or atelectasis, it has become clearly evident that one reason why it was thought that bronchitis so generally accompanied the pneumonia of children, has been that a large number of cases, heretofore classed as pneumonia, were in reality cases of bronchitis attended with collapse. It has been shown, indeed, in the preceding pages, that there is good reason to believe that a very large majority of the cases hitherto described as lobular pneumonia, ought to be classed under the head of bronchitis. Now, these cases are precisely those in which bronchitis has been found to occur so constantly, and to form so large a portion of the disease, and they, moreover, have always been stated to be of much greater frequency than cases of lobar pneumonia. If, however, we conclude to regard what was formerly called lobular pneumonia, as bronchitis with collapse, and to restrict the title of pneumonia to the cases in which there is a true hepatization of the lung, we shall have left only lobar pneumonia, which is not at all a rare affection, and partial pneumonia. Now, in the lobar pneumonia of children, as in that of adults, bronchitis does not usually exist to any very considerable extent, and we may state, therefore, that, though bronchitis exists to a greater or less extent in most of the pneumonic cases of children, it is in a much less severe degree than was at one time supposed.

When bronchitis is present it varies from simple increased vascularity with augmented mucous secretion, to intense congestion with purulent or pseudo-membranous secretion.

*Pleurisy* is a frequent complication, as it is found to exist in about half the cases.

*Emphysema* is another common complication. It generally occupies the upper part of the lung, or its free edge, and is found most strongly developed in the lung which presents the greatest amount of inflammation, or in both, when both are inflamed. Its degree depends on the extent of the pulmonary inflammation and bronchitis, and the severity of the dyspnœa. The vesicular form is much more frequent than the interlobular.

SYMPTOMS; SKETCH OF THE DISEASE; COURSE.—In order to present a faithful account of the disease, a general sketch of the symptoms will first be given, after which the most important ones will be considered separately under the head of particular symptoms, so that the reader may first obtain a notion of the course of the disease, and then become intimately acquainted with its details and peculiarities by reference to the remarks on each particular symptom.

True pneumonia, with well-marked hepatization, is not, according to our experience, a common affection in young infants in private practice, since out of fifty cases of the disease that we have met with in children, in which we have noted this point, only two occurred in infants within the first, and three in the second year. Of the two cases within the year, one occurred in a child six weeks old, and the other in one seven months.

In *new-born children, and those still at the breast*, pneumonia very generally begins with more or less marked symptoms of bronchitis, though in some instances it commences suddenly, as it does in adults, without any previous sign whatever of bronchial inflammation. When it occurs during an attack of bronchitis, the symptoms which belong to the pneumonic inflammation will, of course, have been preceded by those which depend on the disease of the bronchial mucous membrane. In these cases, the development of the pneumonia will be indicated by an aggravation of the general symptoms, by an increase of the oppression, by the fact that the cough and breathing both become more painful than before, and by the occurrence of the physical signs peculiar to pneumonia, or, in other words, by the symptoms which depend upon and mark a state of inflammation of the parenchyma of the lung. Of these we shall now give an account.

When pneumonia appears as a primary affection in young children, without preceding bronchitis, as sometimes undoubtedly happens, though much less frequently than in children over five years of age, and especially than in adults, the attack is usually sudden. The first symptoms observed are restlessness, peevishness, disposition to cry, a diminished appetite for the breast, and feverishness. These symptoms are most marked in the evening and night. From the very first, or by the second day at least, cough is heard, and careful examination of the breathing will show that it is somewhat hurried. The cough is dry, short, and hacking, at first, and not very frequent, but it soon becomes louder, fuller, more straining, and especially it becomes painful. The fact that it is painful may always be ascertained by watching the motions of the child, its cry, and the expression of the face. We can always perceive, even in an infant, a disposition to restrain the cough, to smother it, a struggle to make it short and sudden, when it causes sharp pain. At the moment of the cough, too, a marked expression of pain, a kind of sudden grimace or twisting of the features, may always be observed, which is accompanied or followed instantly by a loud, sharp cry, or a spell of crying. This grimace of pain, with the accompanying cry, we have never observed in their most characteristic form in simple bronchitis, but only in pneumonia and pleurisy. We have twice seen these symptoms so decidedly marked that they could not fail to have drawn any one's attention; once in an infant six weeks old, who died of a most violent and extensive pleuro-pneumonia, and again in a child thirteen months old, who died of pleurisy resulting in the formation of pure pus in the pleural sac. The nature and extent of the lesions were ascertained, in both cases, by examination after death. The presence of pain in the side is shown also by the fact that full inspirations, caused by changing the position of the child, and those which occur during fits of crying, occasion a sudden arrest or stoppage, so to speak, of the act of inhalation, which gives to the crying, and often also to the breathing, a sobbing character, while across the countenance passes at the same moment the expression of pain already referred to. The breathing, which is only slightly disturbed at first, soon becomes frequent and attended with more or less effort, and gives rise to an unusual play of the nostrils, a symptom which ought always to attract attention to the respiratory system as the seat of disorder. It interferes also with the act of nursing, so that whether the child takes the breast less frequently than usual, from want of appetite, or seeks it with greater avidity than common, from thirst, the act of sucking is attended with some difficulty. The infant seizes the breast for a few instants, then lets go in order to breathe more easily, and seizes it again; or it drops the nipple suddenly and begins to cry, as though the act of sucking were painful from the necessity it begets of taking occasionally a fuller and deeper inspiration than usual. As a general rule, the bowels are torpid, while vomiting, which is rather unusual in older children, is quite common in young infants.

When the disease is once established, whether it have been preceded by bronchitic symptoms, or occur as a primary affection, the symptoms are generally well marked, so as to leave but little difficulty in the recognition of the disorder. The child now loses all gayety and cheerfulness, and becomes either dull and listless, or very restless, peevish, and troublesome. Young infants generally lie quietly on the bed, or in the lap, merely fretting and crying when they cough, or when they are moved for any purpose, while children of several months old, and those in the second year, are usually very cross and restless, crying and screaming when anything is done for them, and insisting upon being frequently moved from the cradle or bed to the lap, or from the lap to the cradle. As a general rule they are contented only upon the lap, always crying to get back when they are removed from it to the cradle or crib. In some instances, however, they, like young infants, are quiet and dull, being content to lie still when placed in a comfortable position, and crying only after coughing, for the breast or drink, or when disturbed.

A febrile reaction now displays itself in full force. The skin becomes hot and dry, and the pulse frequent, rising to 150 and 160, or higher, in infants, and to 140 and 150, or even 160, in those of several months old. The dyspnœa becomes more and more evident. The respiration rises to 60, 70, 80, or even higher. In a case of pleuro-pneumonia at six weeks of age, we counted it at 128. The breathing is at the same time more or less labored and difficult, the alæ nasi being seen to dilate spasmodically at each inspiration, while the motions of the chest, and especially those of the abdomen, are much stronger and more active than in healthful respiration. The cough is now more frequent than before, evidently painful, and usually dry, though sometimes a slight degree of looseness may be detected in the sound which it occasions.

Percussion now reveals manifest dulness over the seat of disease, which is usually the base, though not at all unfrequently the upper region of one side. When the disease is double, which is oftener the case, as already stated, in children, than in adults, though not so often as has been supposed by some, the percussion will be dull of course over the affected region on each side. Together with the dulness of sound on percussion, and sometimes when this is faintly marked, there is an evident diminution of the elasticity of the walls of the chest, and this becomes, therefore, an important symptom, especially when dulness on percussion is absent. The dulness on percussion is not, indeed, so marked a symptom in infants as in adults, from the fact that the natural sonority of the chest is so much greater in the former than the latter.

Auscultation reveals over the diseased part distinct and abundant fine subcrepitant râle; but the crepitant râle or fine crepitation, which is the pathognomonic sign of pneumonia in adults, and which in them is rarely wanting, is absent in young children, or is heard only when they make deep and free inspirations. It is most apt to be heard in young children during the deep inhalations which they make just before crying, or during the act of crying. It is, therefore, much less constant, less strongly marked, and more fugitive, in children than in adults, and is, in the former, replaced in good measure by a fine subcrepitant râle. In connection with these symptoms we always have more or less well-marked bronchial respiration. This may be pure, which is rarely the case; it may be, as usually happens, associated with crepitant or subcrepitant rhonchus, or it may be heard only in the expiration.

The symptoms above described show that the inflammation has reached the second stage, or that of red hepatization. After attaining this point, the disease usually remains stationary for a few days, and then either subsides, in favorable cases, by the resolution of the inflammation, or in unfavorable cases, terminates fatally in this stage, or else passes into the third stage, and causes death by a more or less extensive suppuration of the lung. In favorable cases, which are said to be rare in very young infants, but more common in those several months old, and in the second year of life, the severity of the symptoms gradually diminishes. The fever subsides, the pulse becoming less frequent, and the skin cooler and less dry; the breathing becomes easier and slower, and is attended with less pain; the cough grows looser, less frequent, less difficult, and ceases to be painful; the child begins to nurse without pain and with greater ease and facility; the restlessness and fretfulness, or the somnolence, when that has been a marked symptom, diminish, and the child becomes more placid, and sleeps quietly and tranquilly. The chest is now less dull than before on percussion; the bronchial respiration begins to diminish in intensity, and is very much masked by the subcrepitant râle, which becomes more and more evident, until at last it takes the place entirely of the bronchial breathing. The symptoms continuing to amend, the physical signs of the disease cease at length to be perceptible, the cough grows more and more loose and rare, the countenance becomes natural, the fever ceases, and convalescence is fully established.

In unfavorable cases, death may occur rather suddenly in the second stage, without any very decided change in the physical symptoms, from exhaustion or from the supervention of collapse of portions of the lung-tissue. In these cases, the breathing becomes more and more rapid and labored, or it becomes slower than before; the moist râles increase in abundance and extent, while the percussion often remains about the same; the difficulty of sucking increases, so that the child, when put to the breast, attempts to draw but two or three times, and then lets go exhausted and distressed, or it makes no effort whatever; the cough becomes less frequent, but is still painful and difficult; the skin grows pale and white, excepting about the face, hands, and feet, where it often assumes a bluish or cyanotic hue; the extremities, and often the face too, become cool; the child becomes exceedingly restless, and then dull and perfectly quiet, or comatose, and death at last occurs from asphyxia. In another class of cases, which, however, are much more rare in very young children than in older ones, the disease passes into the third stage, or that of suppuration so-called. In such cases the febrile symptoms continue much longer than in those just now described; the pulse becomes, and continues for several days together, very frequent and jerking; the skin retains its heat and dryness, though it is often pale at the same time; the child is usually excessively irritable and distressed; the breathing is rapid and oppressed, and often very irregular and uneven; the dulness on percussion extends; the bronchial respiration becomes more distinct and is heard over larger surfaces, and is accompanied with less of the subcrepitant and crepitant râles; the cough is paroxysmal, painful, and often very harassing; the appetite is lost, and the sleep uneasy and often broken. These symptoms continue for several days, or a week or two, when they assume the same characters they exhibit in more rapidly fatal examples; that is to say, asphyctic phenomena develop themselves, and the child dies exhausted and comatose, or perhaps convulsed, or after presenting for some hours, or a day, more or less severe spasmodic affections of different muscles or of the extremities.

The *lobar pneumonia of children over two years*, and especially of those over five years of age, exhibits most of the symptoms that characterize the same disease in adults. The chief differences to be noticed at these two periods of life, are the greater predominance of bronchitis in children, particularly in those under five or six years of age, which gives to the physical signs some peculiar features not observed in adults; the frequent absence of expectoration, and, when it is present, certain differences between it and that of adults; certain peculiarities in the character and seat of the side-pain; and the existence in many instances of more marked and more dangerous nervous symptoms.

The mode of onset is very different in different subjects. Generally, the attack begins with violent fever, increased frequency of breathing, more or less pain in the side, and short, dry cough. In such cases there is no difficulty in perceiving that the disease consists of some form of thoracic inflammation. But, in other instances, instead of this open and frank development, the disease comes on with symptoms which might well mislead any but a very attentive and competent physician, as to the true nature of the case. The most common cause of obscurity is a predominance of the nervous symptoms, which often gives to the case very much the aspect of a meningeal inflammation. In an example that occurred to one of ourselves, a boy between six and seven years old was seized, after a short exposure during a ride on a raw and cold day, with violent fever, pain in both ears, severe frontal headache, and great sensibility to light when exposed to it. He was, at the same time, very drowsy, sleeping nearly the whole day, but he could be roused when loudly and vehemently spoken to so as to answer a few questions and manifest great irritability, and, what was extremely suspicious of disease of the brain, when taken with the other symptoms, he vomited frequently. On the second day, the headache was very severe, the sensibility to light continued excessive, and he still vomited frequently, rejecting even water. The bowels were freely moved. There was up to this time no full cough, but only an occasional, and slight hacking, that scarcely attracted attention. The respiration was accelerated, but there was no dyspnœa. No pneumonia could be detected, though carefully sought after. On the third day, the breathing was still more frequent, but not at all laborious; the vomiting continued, but the other nervous phenomena had lost some of their intensity, and auscultation revealed well-marked bronchial respiration before and behind, over the summit of the right lung, while over the same regions the percussion was dull. We have met with several cases in which the onset of pneumonia was attended with nervous symptoms that made the diagnosis difficult and obscure.

In other cases the onset of the disease is marked by symptoms of gastro-intestinal irritation, or by such a degree of fever and disturbance of the nervous system, with absence of evident local phenomena, as to render the nature of the attack obscure and uncertain. In one, for instance, occurring in a boy between four and five years old, and six weeks after recovery from measles, the attack began suddenly with violent fever, great restlessness and distress, vomiting, and distension of the abdomen. The case appeared to be one of gastro-intestinal disorder, as there was nothing to call attention to the thorax. On the second day, the symptoms were much worse, the skin being hot and dry, and the pulse one hundred and sixty in the minute, and jerking. The child was drowsy and heavy; it was difficult to make him answer questions, and his answers were confused and unintelligible; his movements were tremulous and uncertain. The tongue was dryish and very thickly coated, and he complained confusedly of pain in the abdomen, which was much distended, and sonorous on percussion. There was no sign of respiratory disease, except some quickening of the breathing, and a very slight cough, scarcely to be noticed. At this moment, however, when scarlet fever was apprehended from the great frequency of the respiration, the drowsiness, and the tremulous character of the muscular movements, auscultation and percussion revealed the true nature of the sickness in the shape of a lobar pneumonia of the lower lobe of the left lung.

In a majority of the cases, however, instead of the obscure and deceptive onset we have just described, pneumonia begins with fever, acceleration of the respiration, pain in the side, and short, dry cough. In some instances the disease supervenes upon catarrh or bronchitis. The child ceases to play, refuses to be amused, and is either irritable and cross, or lies listlessly upon the bed, or, if still quite young, insists upon being kept upon the lap. In some few cases, in very young children, convulsions occur. The appetite is lost, or else very much diminished; the thirst is acute, and the disease once established, more urgent than in almost any other disease. Vomiting is quite common, especially in young children, but diarrhœa is rare, the bowels being generally more torpid than usual. From the first day often, and almost always by the second, we can perceive either crepitant or subcrepitant rhonchus, and sometimes bronchial respiration, confined usually to one side, and more frequent below than above, though, be it remarked, not at all rare over the latter part.

As the case proceeds, the fever increases, the bronchial respiration becomes more distinct and is heard over a larger extent of surface, whilst the râles diminish in abundance. The skin is now very hot and dry, so as to impart a burning sensation to the hand; the pulse augments in frequency, seldom counting less than 140 in the minute, often mounting to 160, and in severe cases, and in young children, even to 170, and becoming full and hard; the respiration becomes more and more accelerated, until it rises to 40 or 50, and in a great many cases to 60, 70, or even 80, while it often becomes at the same time oppressed, and, when full inspirations are made, painful; the cough is frequent, dry, or almost dry, and painful at first, but after a few days begins to be moist, and, in children over six or seven years of age, is not unfrequently attended with an expectoration of rusty or sanguinolent sputa; the thirst continues intense, the appetite is null, and the child is very restless and irritable, or drowsy and inattentive. About the fourth or fifth day, as a general rule, the disease has attained its height, the febrile and local symptoms being then most marked, and the extent of the inflammation greatest, as shown by the physical signs.

At this stage of the disease, the bronchial respiration is generally strongly marked, being clear and distinct, audible both in inspiration and expiration, and accompanied by bronchophony or increased resonance of the cry. The dulness on percussion is also very evident, the change from the natural sound being easily perceptible on a comparison of the two sides.

The symptoms generally remain stationary at this point for one or two days, and then begin to subside. The heat of skin diminishes and perspiration often appears; the pulse falls in frequency and force; the respiration becomes slower, easier, and full inspirations can be taken without pain; the alæ nasi no longer dilate; the cough becomes quite loose, and ceases to be painful; the thirst is less acute; the child loses some of its irritability and restlessness, and if it have been soporose and dull, becomes more wakeful and observant; the flushing of the face disappears, while the expression is more natural. On auscultation, the bronchial respiration is found to have lost some of its intensity; it has become more distant, or it is heard only in the expiration, and is mingled with, or in part replaced by, crepitant or abundant subcrepitant rhonchus. The dulness on percussion is less marked. A little later, the fever ceases entirely, the respiration reassumes its natural rate, the appetite returns, the thirst disappears, the cough subsides very much, and the child begins to be interested in its toys or occupations. About the tenth or fifteenth day, and in some cases rather earlier, convalescence is fairly established, though auscultation may still reveal some prolongation of the expiratory sound and diffuse resonance of the voice.

In unfavorable cases, death seldom occurs early in the disease, but usually at some distance of time from the invasion, and in consequence, no doubt, of the transition of the inflammation into the third or suppurative stage. In such cases the disease has usually pursued the course just described up to the period of resolution; but, instead of resolution and convalescence taking place, the fever continues, though perhaps with diminished violence, the skin being less intensely hot, and the pulse less full and active, while it remains quite as frequent. The breathing is sometimes less frequent than before, but it is often more laborious, and very generally it becomes irregular, and is easily hurried under exertion. The cough varies very much, being sometimes almost suppressed, and in other cases very troublesome; it is almost always loose. The strength diminishes, the voice becoming weak and feeble, and the muscular movements tremulous and languid; the face looks pale, haggard, and sunken; the child is sometimes very restless, tossing about from time to time on the bed or lap, with a quick, short, and evidently feeble movement, or it is dull and soporose, awakening only when spoken to, but showing then by its fretfulness and peevishness that its intelligence is retained. While these symptoms are present, the extent over which the bronchial respiration is heard has generally augmented, showing the gradual extension of the hepatization, while outside of the part where the respiration is blowing, and sometimes over the same part, and intermingled with that sound, are heard more or less copious subcrepitant and mucous râles. This condition seldom lasts more than two or three days, at the end of which time the child dies in a state of coma, or after one or more convulsive seizures, which are the result of a gradually increasing asphyxia.

In other cases, again, the termination is more gradual. The child, after presenting many of the above symptoms, may seem to improve somewhat. The fever may diminish, the appetite return to some extent, the respiration become easier, the restlessness subside, and the child becomes more cheerful again; but the face continues pale, emaciation makes progress, the appetite fails again, the pulse remains frequent, diarrhœa comes on, the cough becomes more troublesome, thrush often attacks the mouth, the strength decays continually, and, after some weeks perhaps of struggling, the child dies in a state of great emaciation and debility.

The symptoms of *partial* pneumonia are much more obscure and uncertain than those of the lobar form of the disease. Owing to the fact that the inflamed patches of the lung are disseminated or scattered through healthy portions of the organ, the signs afforded by physical examination are either very imperfect, or entirely masked by the sounds produced in the healthy texture. We are forced, therefore, to depend much more in this than in the lobar form, on the rational symptoms, in determining the nature of the sickness. The rational symptoms of partial pneumonia are nearly the same as those of the lobar form. The chief differences between the two are in regard to the pain, the dyspnœa, and when there is expectoration, in the amount of the sputa. The febrile and nervous symptoms, and the disturbances of the digestive system, are the same in the two forms, the only difference being in their degree of severity. In the lobar variety they are usually more acute and severe than in the partial. The local symptoms present important differences which should be noted. In the form under consideration, the pain is either wanting entirely, or is much less acute than in the lobar form. When the inflamed patches are few in number, and they are seated in the central parts of the lung, there is entire absence of pain; but when they are more numerous and superficial, pain is complained of, but it is usually diffuse, of slight intensity, changeable, and felt only during cough, or during full inspirations. It makes its appearance commonly on the first day, and very seldom after the third. Cough is rarely wanting. It usually marks the onset of the sickness, is extremely variable as to its frequency and severity, and is not acutely painful, as in the lobar form, unless the inflamed patches be superficial. There is seldom any considerable amount of expectoration, and in some cases none; when there is any it is small in quantity, and it may or may not be characteristic. In one case, however, that came under our observation, in which we had every reason to believe, from the nature of the rational symptoms, and from the absence of physical signs, that the disease was partial pneumonia, there was a rare expectoration of thick, viscous mucus, streaked with blood. The respiration is accelerated, and, when the lesion is at all extensive, there is dyspnœa, the degree of these symptoms being determined by the extent and number of the inflamed patches.

The physical signs are not, as above stated, very significant. The percussion is natural, the amount of tissue consolidated being insufficient to affect the sonorousness of the chest. Auscultation affords no signs of the pneumonic inflammation when the number of affected patches is small; when they are more numerous it is of some, but not of very great utility. Crepitant râle is sometimes heard here and there over circumscribed points of the thorax, and, disseminated in the same way, there is also heard in some instances rude respiration, prolonged expiratory murmur, and bronchial respiration. When, as often happens, this form of the disease coexists with bronchitis, it will be entirely concealed by the dry and moist râles of the latter affection.

The *duration* of pneumonia has been fixed with considerable accuracy by the observations of various persons. As a general rule, the disease reaches its highest point of severity in about four or five days, then remains stationary for one or two days, and diminishes regularly until between the tenth and fifteenth day, when convalescence is established. In our own practice, the longest duration in 22 unmixed cases, in which the period was accurately noted, was 17 days, and the shortest 5. The duration of the 19 cases was as follows: in 1 case, 17 days; in 2 cases, 14 days; in 1, 11; in 4, 10; in 5, 9; in 3, 8; in 2, 7; in 2, 6; and in 2, 5 days. One case lasted 33 days, but it was accompanied and followed by bronchitis.

Particular Symptoms; Physical Signs.—In order to practise auscultation and percussion in a young child, it should be placed, by the mother, in a sitting posture on her knee, while the physician, kneeling on the floor, or sitting on a low chair, makes the examination he deems necessary. If the child be old enough to take notice, it should be attracted and amused by some toy or glittering object. Even, however, should it cry violently, much valuable information is to be obtained by the examination, for we can ascertain the presence or absence of rhonchi and their characters during the deep inspirations between the cries, and can observe resonance of the cry and cough, and practise percussion.

The physical signs of *lobar pneumonia* are crepitant or subcrepitant rhonchus, feeble respiration, bronchial respiration, bronchophony, resonance of the cry and cough, and dulness on percussion. They are, in fact, the same in the great majority of cases as in adults. Under five years of age, this form often begins with subcrepitant rhonchus, while after that period the earliest stethoscopic signs are crepitant rhonchus, or feeble respiration. The bronchial respiration makes its appearance soon after the subcrepitant or crepitant rhonchus, is heard first in the expiration, and then in both inspiration and expiration, and is accompanied by bronchophony, resonance of the cry and cough, and dulness on percussion. Bronchial respiration was present in 46 of the 57 cases of lobar pneumonia observed by ourselves; crepitant râle was present in 31, and subcrepitant in 10.

These alterations of the auscultatory phenomena are confined to one side, in the great majority of cases, and are best observed over the postero-inferior portion of the lung. MM. Rilliet and Barthez state that they have never known the bronchial respiration to disappear, in favorable cases, before the fifth day, and in the majority not before the seventh, eighth, or ninth; while, in fatal cases, it continued to the moment of death. Its persistence is always a highly unfavorable symptom in very young children, whilst in those who are older, as in adults, it sometimes remains for several days or weeks, though the general symptoms have entirely disappeared.

RATIONAL SYMPTOMS.—*Cough* may be said to be invariably present. It is dry at first, and not very frequent, but in one or two days becomes more frequent, often very troublesome, and from dry and harsh, becomes more or less humid and loose. It continues until the disease moderates, lasting generally from nine to sixteen days. In fatal cases it usually persists to the last. In infants it is not very frequent, occurs in short paroxysms, and in fatal cases often ceases one or two days before death. MM. Rilliet and Barthez remark that in pneumonia of the upper lobes, it has a peculiar character. It is little, short, smothered, as it were; or piercing, teasing, or slightly hoarse. We will merely add that cough is sometimes scarcely noticeable in cases which simulate hydrocephalus, during the early part of the attack. In a case already referred to, that occurred to one of ourselves, in which the symptoms bore for several days very much the aspect of a meningeal attack, there was no full cough whatever during the first two days; on the third day, though auscultation and percussion showed the existence of pneumonia of the upper lobe of the right lung, the child coughed only three or four times, and it was not until the sixth day that it became at all frequent. In three other cases the cough was so slight in the early stages of the disease, during the continuance of the cerebral symptoms, as not to have been noticed unless particularly inquired after. Later in the attack, after three, four, or five days, and as the cerebral symptoms moderate, the cough became frequent and loose, and the pneumonic symptoms pursued their regular course.

*Expectoration* is almost invariably absent under five years of age. MM. Rilliet and Barthez, and Dr. Gerhard, have never observed rust-colored sputa under the age mentioned. In older children there is sometimes, though not very often, voluntary expectoration. Even in them, however, the sputa seldom present the characteristic rust-color and viscidity observed in adults, but consist simply of mucus tinged with blood, or of whitish, brownish, viscous, or non-viscous phlegm. We once, however, saw a child three and a half years old, voluntarily expectorate viscid mucus, tinged copiously with blood. Sanguinolent expectoration was noticed in five of the fifty-seven cases seen by ourselves (not including the one just spoken of). In three the sputa were of the characteristic rusty color, in one they were composed of mucus streaked with blood, and in another portions of mucus streaked with blood were rejected by coughing, and some also by vomiting. The age of the five subjects, just alluded to, was in each case between five and nine years. In another case (not included amongst the five), in a girl seven years old, affected with lobar pneumonia supervening upon pertussis, there was a free expectoration of tenacious mucus, sometimes streaked or dotted with blood, sometimes brownish, and sometimes rust-colored.

M. Valleix mentions a whitish or sanguinolent viscous froth, as sometimes escaping from the mouth of new-born children laboring under the disease, and Bouchut has also noticed in a single case, a little reddish sanguinolent froth, situated on the edge of the lips of an infant with pneumonia. We have never met with this symptom, but know of one case of a child within the month, who, during an attack of pneumonia, vomited mucus tinged with blood. The child died, and presented the lesions of pneumonia. The nipples of the mother were perfectly healthy, so that the blood could not have been sucked by the child from them, but must have consisted of the sputa which had been swallowed after being coughed into the fauces.

It is scarcely necessary to say that the absence of expectoration is only seeming, for children undoubtedly cough the sputa into the fauces, whence, instead of being rejected, as by the adult, they pass into the stomach.

*Thoracic Pain.*—It is impossible to ascertain the presence of this symptom with positive certainty prior to the age at which children talk, and very often not for some time after, as they refuse or do not know how to describe their sensations. And yet, even in infants, the presence or absence of the stitch in breathing, and of pain in coughing, may be inferred, almost with certainty, by watching the gestures and expression of the child, and the cries which accompany a full inspiration and the act of coughing. In effect, the deep inspirations induced by moving the child, those which take place during vomiting and gaping, and those also which occur in the act of coughing, cause the child to cry out suddenly and sharply, and give at the same moment an expression of acute suffering to the countenance, which can be referred to nothing else than the causes just mentioned, and which reveals almost as plainly as words the painfulness of a deep inhalation and of the act of coughing. In older children, we have several times known the pain to be most intense, causing bitter and repeated complaints, with crying, fretting, and evident acute suffering. The seat of pain, as complained of by children who talk, ought also to be noticed, since the account given by them might well mislead an unwary and inexperienced physician. It is quite common, in fact, for them to refer the pain to the false ribs, to one of the flanks, to the abdomen, and even to the hip.

The *respiration* is always quickened, except where the constitution of the patient has been greatly deteriorated by long and severe illness or other causes, under which circumstances it may remain at the normal rate, or be very slightly accelerated. This symptom usually dates from the invasion, soon after which the breathing rises as high as 40, 50, and 60 in the minute in older children, and from 60 to 80 in the younger. It sometimes becomes excessively rapid, reaching, as it did in a case of pleuro-pneumonia in an infant six weeks old under our charge, 128. In favorable cases, the acceleration subsides usually about the seventh, eighth, or ninth day. In most of the cases the breathing is even and regular, while in others it is short, abdominal, uneven, and jerking. When the dyspnœa is very great in a young child, the nostrils dilate widely, the mouth remains open, and its angles are drawn downwards and outwards; the last of these symptoms is almost a fatal one. Sometimes the rhythm of the function is changed, so that it begins with a sudden, active, and moaning expiration, followed by the inspiration, after which comes the interval of rest. MM. Rilliet and Barthez state that unequal, jerking respiration, occurs almost exclusively in cases of inflammation of the upper lobes.

*Physiognomy.*—The face is almost invariably flushed. The color, at first scarlet, becomes after a day or two deeper and darker, and in severe cases assumes a livid red tint. We have noticed in very severe pneumonia, in addition to the deep red tint, a peculiar glazed appearance of the skin, which looks as though it had been varnished, while the edges of the flush are distinct and abrupt. The lips are generally deeply colored, simultaneously with the face. The flush commonly subsides about the same time, or a little before the diminution in the rate of the respiration. In fatal cases, the face is apt to lose its color, and become pale and sallow, as the unfavorable symptoms become more and more marked. The pallor of the face is most striking in severe and fatal cases occurring in infants; the face is blanched, and the features pinched.

The expression of the face is one of anxiety and oppression in the early stage; in very severe cases, or those about to terminate unfavorably, the features become drawn and contracted.

*Fever* exists in all the idiopathic cases. The pulse, at all ages, is rarely under 130 from the first to the sixth or seventh day; in the youngest children it rises as high as 140, 160, and even 180; while in those who are older, it is seldom above 140. In favorable cases, it diminishes about the fifth, sixth, or seventh day. In fatal cases, it is apt to diminish at the same period, but soon becomes more frequent and continues so to the end.

The *skin* is hot in the beginning, and continues so until the disease subsides. The heat is intense in severe, but not so great in milder cases.

The *nervous system* shows more or less marked symptoms of disorder. There is restlessness, peevishness, and irritability during the day, and these increase towards evening. As the night advances, the child becomes still more restless; infants will not sleep except in the arms, and wake crying or fretting every few minutes or hours; older children sleep uneasily, talk in their sleep, or start and cry out, and are often delirious. In some instances, the irritability is most distressing, both to the child and to those around. The child is constantly fretting and whining; it wants its playthings, but will not touch them; food, but rejects it; and slaps and scolds at everything about it. Convulsions sometimes occur at the invasion. They last an uncertain length of time, and are usually followed by insensibility, from which the child wakes with fever, accelerated respiration and cough, indicating the true seat of disease to be the lungs, and not the brain, as might at first be supposed. We have met with but three cases attended with convulsions. One occurred in a boy between ten and eleven years of age, on the second day of the disease. The attack was induced more, however, by an unwholesome meal taken on the first day of his sickness, than by the mere effect of the local inflammation. In a second case, which occurred in a boy between five and six years old, there were two convulsive seizures, a violent one on the first day of the pneumonia, and a slighter one a few days later. In the third case, which occurred in a boy aged two years, the pneumonia occurred in the course of intermittent fever; there were three marked convulsions, but the child subsequently recovered perfectly. The headache is sometimes very severe; in a few instances we have known it to be so violent as to constitute the most prominent symptom of the case. On one occasion, indeed, it was so intense, and so much complained of, during the first two days of the fever, as to withdraw our attention from the true seat of disease, and it was not until the third day that we discovered the existence of pneumonia. The cough was in this, as in other instances, in which the nervous symptoms were strongly marked, so slight as to escape notice.

*Digestive Organs.*—Complete anorexia is generally present from the first; the thirst is intense, greater indeed, than in almost any other affection of childhood. The tongue is moist, as a general rule, and covered with a whitish or yellowish fur. Vomiting and diarrhœa occur at the invasion of about half the cases in hospitals; in private practice, vomiting often occurs, but diarrhœa much less frequently.

*Urine.*—The amount of urine is materially lessened in acute pneumonia, the extent of the reduction being from one-third to one-half (Parkes).

During the height of the disease the urea is increased, and with it, as in most febrile diseases, the uric acid. Simon and Redtenbacher first called attention to the fact that the chloride of sodium is diminished or entirely absent during the early period and at the commencement of hepatization, and reappears during, or rather after resolution; and further researches have fully confirmed this observation, since very few exceptional cases have yet been recorded. The disappearance does not depend upon the reduced diet, since Howitz and Parkes both state that even when chloride of sodium is administered, none can be detected subsequently in the urine. And the fact that it is in reality retained in the system, is further shown by the very excessive excretion during convalescence. According to Beale's observations, the exudation in the lung is very rich in chloride of sodium; and it has been found that as this salt disappears from the urine, it appears in the sputa, and in turn as it returns in the urine, it disappears from the sputa.

It is true that more extended observation has shown that the chloride of sodium is absent or deficient in many other affections, both febrile and inflammatory; but still, although not pathognomonic of pneumonia, this sign is an aid in its diagnosis, and probably serves to distinguish it from collapse of the lung or tuberculous consolidation.

One more condition of the urine in pneumonia, although as yet, so far as we know, only noticed in adults, deserves attention. We allude to the presence of albumen, which has been noticed by several observers, as Finger, Becquerel, Parkes, and Heller, in almost 45 per cent. of their cases; though others have but rarely found it.

The period of its occurrence is variable; according to Heller and Parkes, it appears at the time when the chlorides are most deficient, as hepatization advances. The fatality is much increased in cases where albuminuria is present; the combined record of the observers above referred to, yielding a mortality of almost 50 per cent. of such cases; whilst the mortality in cases without albuminous urine was only 14 per cent. According to Parkes, renal cylinders are very common in the albuminous urine of pneumonia; and a little blood is also frequently present, but is usually out of all proportion to the albumen.

DIAGNOSIS.—The *lobar* pneumonia of children is most liable to be confounded with bronchitis, pleurisy, and meningitis. There is little probability, however, that lobar pneumonia would be mistaken for bronchitis by any but a careless or incompetent observer; for the presence, in the former, of subcrepitant, and very often of crepitant rhonchus, of bronchial respiration, bronchophony, resonance of the cry and cough, and dull or flat percussion, confined to one side, would easily distinguish it from bronchitis, which is marked by dry and moist râles over both sides of the chest, and by a normal condition of the percussion. It is difficult and often impossible, as already stated, to detect the existence of *partial* pneumonia, at least to make the diagnosis with absolute certainty. The cause of the difficulty, as before explained, lies in the fact that it presents, in a great many instances, no clear physical signs. When the number of inflamed nodules scattered through the healthy texture of the lung is small, and especially when they are deeply seated, no alteration whatever of the natural respiratory sounds can be perceived, and we are obliged to depend entirely upon the rational symptoms,—the accelerated breathing, oppression, pain, cough, fever, and the absence of the physical signs of other pulmonary inflammation. Sometimes the presence of the characteristic sputa of pneumonia will, in older children, make the diagnosis clear. When the inflamed nodules are situated near the surfaces of the lung, we may, in some instances, detect crepitant or fine subcrepitant râle, and bronchial respiration, over circumscribed portions of the lung, and there would be, under such circumstances, no hesitation as to the diagnosis.

It has been stated that pneumonia might be confounded with pleurisy. This could not happen in regard to the partial form, as the slighter degree of the pain, the limited extent of the râle and bronchial respiration, and the absence of dulness on percussion in the latter, would prevent such a mistake. The distinction between pleurisy and the lobar form is more difficult, but may generally be made out by attention to the fact that pleurisy is rare under six years of age; by the greater severity of the pain, the absence of rhonchi, the effect of change of position on the sounds yielded by percussion, the shorter duration and greater mildness of the general symptoms, the entire absence or small amount of expectoration, and by the continued dryness of the cough in pleurisy; and, lastly, by the disposition on the part of pleurisy to become chronic, while pneumonia nearly always runs an acute course.

Pneumonia in children not unfrequently simulates, in its early stage, an attack of meningitis, constituting a form of the disease sometimes called *cerebral pneumonia.* Vomiting, constipation, extreme irritability or restlessness, and complaints of headache, occur in both; while the absence of thoracic symptoms to draw attention to the true seat of the disease in pneumonia, may readily mislead. The cough in the early stage of pneumonia is sometimes very slight, and not being observed by the attendants, is not reported to the physician. The frequency of the respiration is overlooked, or, if noticed, is ascribed to the fever, which is supposed to depend on the cerebral inflammation. In pneumonia, however, the vomiting is not usually very frequent, nor very obstinate, nor are the bowels so much constipated as in acute hydrocephalus. These variations from the ordinary symptoms of acute hydrocephalus, minute though they be, ought to attract the notice of the physician, and lead him to examine the case more carefully; when, in all probability, the physical signs would immediately reveal the pneumonia. We may mention, in illustration, that we attended a boy six years old, who, for three days, suffered from violent fever and excruciating headache, which last was the only symptom complained of. There was neither cough, expectoration, nor any marked acceleration of the respiration. After three days the headache moderated, and he had slight pain in his side; on examination, we found him laboring under well-marked lobar pneumonia. In April, 1847, one of us was called to see a boy nineteen months old, who had been taken sick with slight fever, a little hoarse cough, and mild pharyngitis. After remaining in this condition for five days, he began to be drowsy and very irritable, the surface became pale, and the extremities rather cooler than natural. From the sixth to the tenth day, there was great somnolence, the child sleeping nearly all the time; when waked from sleep, he was always exceedingly irritable and cross, scarcely opening his eyes, and then shutting them again immediately to avoid the light, which was evidently painful. During this time he took scarcely any food, but little drink, and vomited several times freely; the bowels were moved without medicine; the surface remained very pale, and the extremities often cool; the pulse was frequent and small, the respiration perfectly regular, for which reason it attracted no attention, and there was *no cough* whatever. Under these circumstances, we hesitated between regarding the case as one of meningitis, or of hydrocephaloid disease, as described by Dr. M. Hall. We took the latter view, however, and treated it with small quantities of brandy, cold to the head, and the frequent employment of mustard pediluvia. From the eleventh day the child began to improve; it would open its eyes from time to time, and look round for a few moments; the face began to show a slight degree of color, and the palms of the hands, which had been white and transparent, exhibited a tinge of the natural pink hue which they have in children. Observing about this time that the respiration was accelerated, though perfectly free and regular, and without cough, we counted it, and were astonished to find it 80 in the minute. We now examined the chest carefully, and finding slight dulness on percussion with bronchial respiration, over the inferior half of the left side behind, immediately understood the nature of the case: it was one of latent pneumonia, simulating hydrocephalus. The child was now treated for pneumonia, and after an illness of twenty-seven days longer, recovered perfectly. As the case progressed, the rational signs of pneumonia were more and more apparent, the cough becoming frequent and painful, and after a time loose, while the cerebral symptoms gradually disappeared.

In addition to these cases, we have met with several others which during the early stage resembled very closely the invasion of cerebral disease. One of these has already been referred to in the account of the symptoms of the disease. Two others occurred in children within the year, and one in a child between one and two years old. Attention, however, to the rate of the respiration and the physical signs, and the presence of slight cough, revealed, in two of them, after a little hesitation, the true character of the attacks. The third case, which occurred in one of the children within the year, was unattended by any cough during the first few days, and was, therefore, very obscure, until our attention was attracted by an acceleration of the respiration, when the physical signs, and at a later period, cough, explained the real nature of the attack. We may remark, in addition, that in all these cases, the absence of constipation, the infrequency and short duration of the vomiting, and some clearness of the intelligence when the child was fairly roused, though but for a few moments, from its state of somnolence, were other motives for doubting the attacks to be meningitis.

Dr. West states that pneumonia is often overlooked in teething children, in whom the cough is called a tooth-cough, whilst the diarrhœa, which frequently occurs, and becomes the prominent symptom, is supposed to depend upon dentition, and is alone attended to. The diarrhœa is obstinate, and when, at last, the cough attracts attention, it is ascribed to phthisis, and the physician is astonished to find at the autopsy purulent infiltration of the lungs, but no tubercles, and no disease of the intestines. The diagnosis is to be correctly made, under such circumstances, only by careful physical examination.

PROGNOSIS.—It may be stated in general terms, that pneumonia is the more dangerous in proportion as the child in whom it occurs is younger; and that the secondary, consecutive, or intercurrent form of the disease is much more dangerous than the primary. It is usually supposed to be almost necessarily fatal in new-born children, and to be very dangerous, though less so than in neonati, up to the sixth year of age. There has been so much confusion, however, in regard to atelectasis of the lung and true pneumonia until within a few years past, that it is scarcely possible to trust to former statistics upon this point. From six years of age up to fifteen, the disease is generally curable when of the primary form; when of the secondary form the result is much more doubtful, and will depend in great measure, of course, on the nature of the disorder during or after which it occurs.

MM. Rilliet and Barthez (*loc. cit.*, p. 535) state that they lost about one-eighth of their cases in private practice. Of these, the youngest was a year old, the oldest, three years old. To quote their own words: "Some evidently died of accidents caused by the medication (poisoning by tartar emetic); one was the victim of a relapse, due to faulty hygienic care; and others died of cerebral pneumonia of the upper lobe; they were undergoing the process of dentition." In the hospital, they lost a seventh of their patients. The subjects under five years of age died of cerebral, gangrenous, or intestinal complications. Those over five years of age died, some because they were scrofulous or feeble, the inflammation, though lobar, being double; and the others, in consequence of the inflammation having become complicated with pleurisy, scarlet fever, or meningitis. They add, that in the hospital, six-sevenths of the patients attacked with secondary pneumonia died.

In 1862, however, Barthez stated, in a memoir to the French Academy (*Med. Times and Gaz.*, May 10th, 1862), that during the previous 7 years, having abandoned the use of depletion in the pneumonia of children, he had treated 212 cases, with the loss of but 2 patients.

The results of our own experience, which, it ought to be remarked, has been acquired chiefly in private practice amongst the easy classes of society, have been as follows: Of 65 cases of well-marked lobar pneumonia, only 2 were fatal. Of these two, one occurred in an infant six weeks old, and was accompanied with extensive and violent pleurisy, and the other occurred in a child between two and three years old, lasted thirty-three days, and was attended with considerable bronchitic inflammation.

In addition to these, we have seen a certain number of cases which are not included in the statistics of our own experience, since some of them were only seen, and, perhaps, but a single time, in consultation, while a few others occurred among the children in the large public institutions of this city. A far larger proportion of these cases proved fatal.

We may conclude, therefore, that pneumonia under two years of age is always dangerous, and much more so when secondary than when primary; that primary pneumonia, between the ages of two and five years, will terminate favorably in the great majority of cases in private practice; and that when the disease attacks children between six and fifteen years of age, the termination is nearly always in health.

The following are some of the most unfavorable symptoms of the disease: convulsions; small, weak pulse; extreme rapidity of the respiration; persistence of the bronchial respiration in young children; incomplete resolution of the disease within the ordinary period; excessive and obstinate diarrhœa; severe cerebral symptoms; great emaciation; greatly altered physiognomy; excessive irritability; and a yellowish tint of the skin. M. Trousseau regards as an unfavorable symptom the occurrence of swelling of the veins of the hands, which he supposes to depend on an obstacle to the function of hæmatosis.

TREATMENT.—When the last edition of this work was published, eleven years ago, a great change had begun to take place in medical opinion as to the proper treatment of disease, and especially of acute disease. In that edition this change of opinion was referred to, and its effect upon our own convictions and methods of procedure freely acknowledged. Since that period this revolution, as it might be called, has continued to make progress, until, at the present moment, no one can candidly express his own views without referring to it. In view of these facts, we shall not hesitate to write at some length on the treatment of pneumonia, in order that our readers, and especially the younger members of the profession, may be able to comprehend not only the changes that have taken place, but some of their causes.

There is another consideration which has been forced upon us by time and experience, which makes us unwilling to dismiss the treatment of so important a disease in a few words, and this is, that the method of cure to be followed in individual cases must be determined not alone by the simple fact that the patient has an inflammatory exudation in the lung-tissue, but, in large measure, by the state of the general vitality of the subject. What folly, for instance, to suppose that we can safely apply the same therapeutic measures to a case of pneumonia in a child just issuing out of severe measles, to one in the midst of a dangerous typhoid fever, to a third in the spasms of hooping-cough, or to a fourth who was yesterday in consummate health, with every function, up to the moment of the attack, in the finest possible working order. To be sure, this is putting the case in very strong terms, but they are not too decided to make our meaning clear.

Moreover, we think there is a tendency, in some of the later works on diseases of children, and in some, too, of the general treatises on the practice of medicine, to lengthened scientific descriptions of anatomical changes, symptoms, diagnosis, &c., and to a corresponding diminution of the space devoted to therapeutics. This error, as we think it (not to be wondered at, perhaps, when we consider the relative difficulty of writing on these different subjects), we desire to avoid, and, indeed, we have found it impossible to state our opinions on the subject except at some length.

*Bloodletting.*—Twenty years ago depletion formed an almost inevitable item in the treatment of pneumonia, but, within the last eight or ten years, the views of most observers have undergone a more or less radical change in regard to its utility and necessity. Some have abandoned it altogether; others employ it still to a moderate extent. In order that the younger practitioner may see the changes which have taken place in this respect, we shall quote the views of some of the more important authorities, and then give our own.

Dr. Charles West (4th Am. ed., from 5th English ed., page 285) "cannot forget the good results which I saw years ago from the abstraction of blood at the outset of an attack of pneumonia in previously healthy children." He, however, does not advise depletion when small crepitation has become generally diffused, still less when dulness or bronchial breathing is perceptible. He gives no statistics as to his own results whatever. Dr. J. Lewis Smith, of New York, in his work, does not even mention bloodletting. Dr. Thomas Hillier, of London, says of bloodletting that it "is now for the most part discarded. I have never had occasion to resort to it." He says further, however, that cases might occur where it would be proper to recommend it. Such conditions would be, the second day of the disease, a large extent of inflammation of the lung-tissue, full and bounding pulse, great pain and dyspnœa, and a temperature of 105° or more. If these conditions existed in a previously healthy child, he would think it wise to take a few ounces of blood from the arm. We have already referred to the communication from M. Barthez to the Academy of Medicine of Paris, in April, 1862, intended to vindicate the expectant treatment of pneumonia in early life. In this paper it is stated that of 212 cases of lobar pneumonia, occurring between the ages of two and fifteen, in the course of seven years, at the Hôpital Ste. Eugénie, only 2 had a fatal termination, although no approach to active treatment was adopted in more than a sixth of the number. Dr. J. Hughes Bennett gives, in *The Practitioner*, for May, 1869, the results of the restorative treatment of pneumonia in 153 cases. Of these, 129 were simple and 24 complicated cases. Of the 129 simple or uncomplicated cases, of which 35 were double, all recovered. Among the 24 complicated cases there were 5 deaths, making of the whole number a mortality of 1 in 30$\frac{3}{5}$ cases. Dr. Bennett's cases all occurred in adults, but the results are useful to us as showing the effects of this kind of treatment.

In the last edition of this work it was stated that one of us had treated 50 cases of well-marked lobar pneumonia, with 2 deaths, in private practice. Full notes of only 46 of these cases were kept. Of the 46 cases, 39 were primary or uncomplicated, and 7 secondary or complicated. The 2 fatal cases occurred, one at six weeks old, and this was attended with very severe pleuritic inflammation, and the other between two and three years old; the latter case lasted 33 days, and was attended with considerable bronchitic inflammation. Depletion was employed in 16 of the 39 primary, and in 2 of the 7 secondary cases. It is proper to state that depletion was not employed in either of the fatal cases.

How difficult is the task of estimating the comparative value of different plans of treatment in any given disease. MM. Rilliet and Barthez lost one-eighth of their cases of pneumonia in private practice, and one-seventh in hospital. We lost one-twenty-fifth of ours in private practice; a result very nearly as good as Dr. Bennett's, though ours were all in children under 15 years of age, and of 37, whose ages were recorded, 19 were under 5 years (2 in the first year, 3 in the second, 5 in the third, 4 in the fourth, 5 in the fifth). Dr. Bennett condemns bleeding almost wholly; we took blood in 16 of 39 primary, and in 2 of 7 complicated cases, and did not deplete at all in the 2 fatal cases. M. Barthez reports 212 cases, treated by the expectant method, with only 2 deaths, or less than one in a hundred; and these cases, too, in children between 2 and 15 years of age, in hospital practice. These last statistics are the most surprising we have seen. We have been unable to find the original memoir of M. Barthez, but have seen the report made to the Academy of Medicine, by M. Blache (*Bulletin de l'Acad. Imp. de Médecine*, t. xxx, p. 21), on the memoir, in which it is stated that "the author has taken care to eliminate the lobular or generalized pneumonias, the pseudo-lobar pneumonias, broncho-pneumonias, and catarrhal pneumonias; he has also thrown aside the lobar congestions which occur in the course of low fevers, and the secondary lobar hepatizations; that is to say, those which occur in the course of any well-determined disease, and particularly tuberculosis." We cannot help thinking that the elimination of so many forms of pneumonia, must be a chief reason for the very great success of the plan of treatment used.

This much, however, has been plainly established by the observations and experience of late years, that the old plan of bleeding, as a rule of absolute practice, merely because of the existence of pneumonia, and especially the Sangrado system of bleeding, *coup sur coup*, was a gross mistake, and one which did great harm. But we do not think it has been proved that the restorative or expectant system, to the exclusion of bloodletting under any circumstances, is always and inevitably the right one. We have been led to think that bloodletting was not the only cause of the heavy mortality under the old systems of treatment, but that the use of such agents as antimony, ipecacuanha, and perhaps calomel, in large and frequently administered, and long-continued doses (and particularly the antimony), by their action upon the stomach, in destroying all power to take and digest food, and by the general prostration which their action (especially antimony) upon the nervous system occasioned, were answerable for a large share of the fatal results of those days. We doubt, in fact, whether depletion, used in anything like moderation, is not safer for the patient than the continued use, for two or three days, of nauseants and depressants, more particularly of antimony. But of the action of antimony upon children, we shall speak more at length hereafter.

Our own opinion, after eleven years of additional experience, since the publication of our last edition, is, that depletion should not be used save in exceptional cases. When the pneumonia is pursuing a regular and safe course, it is best to trust to the simple means to be spoken of hereafter—to follow a mild expectant method. Where the physician doubts as to its propriety, and especially when he is young and inexperienced, it is safest to abstain from it entirely, or to employ it only in a very moderate degree. But there is a certain class of cases, in which we believe that local depletion, by cups and leeches, is not only allowable but most useful. When the subject is vigorous and strong, with a fine sanguification; when the temperature is very high; the pulse strong and full; the muscular force good, and the side-pain and cough very severe, we think that the local abstraction of from two to four ounces of blood, at the age of three or four years, has great power to relieve all these symptoms. Again, when the dyspnœa is very great; when the heart pulsates with great force, whilst the pulse is small and feeble, showing that the right heart is overloaded, and the arteries comparatively empty, in consequence of obstruction to the passage of blood through the lungs; and when the child is tolerably vigorous, and not reduced by previous illness, a moderate venesection is often of more use, and of more efficacy in palliating these conditions, than any treatment we know of. The quantity to be taken should seldom be over four ounces, at the ages of from three years and upwards. We venture upon these statements the more boldly when we find such men as Chambers and Niemeyer, and even Bennett, giving the same advice. Dr. Bennett (*loc. cit.*) lays down amongst his axioms the following: "Small bloodlettings, of from six to eight ounces, may be used in extreme cases, more especially in double pneumonia and broncho-pneumonia, as a palliative to relieve tension of the bloodvessels and congestion of the right heart and lungs." Niemeyer (*Text-Book of Pract. Med.*, Amer. ed., vol. i, p. 184) says, pithily: "Highly as I prize venesection, however, in certain emergencies which may arise in the disease, I had rather that any one, dear to me, and sick of pneumonia, were in the hands of a homœopath, than in the hands of a physician who thinks that he carries the issue of the malady upon the point of his lancet." He recommends venesection in three conditions: 1. When the pneumonia has attacked a vigorous and hitherto healthy subject, is of recent occurrence, the temperature being higher than 105° F., and the frequence of the pulse rating at more than 120 beats a minute. "Here danger threatens from the violence of the fever, and free venesection will reduce the temperature, and lessen the frequence of the pulse. In those who are already debilitated and anæmic, bleeding increases the danger of exhaustion. Should the fever be moderate, bloodletting is not indicated, even in healthy and vigorous individuals." 2. "When collateral œdema, in the portions of the lung unaffected by pneumonia, is causing danger to life, the pressure of the blood is reduced by bleeding, and by prevention of further transudation of serum into the vesicles, insufficience of the lung, and carbonic acid poisoning are averted. Whenever the great frequence of respiration, in the commencement of pneumonia, cannot be traced to fever, pain, and to the extent of the pneumonic process alone, *as soon as a serous, foamy expectoration appears, together with a respiration of forty or fifty breaths a minute*, and when the rattle in the chest does not cease for a while after the patient has coughed, we ought at once to practise a copious venesection, in order to reduce the mass of blood, and to moderate the collateral pressure. The third indication for bleeding arises upon the appearance of symptoms of pressure upon the brain, not headache and delirium, but a state of stupor or transient paralysis." We have made this long quotation because the authority is so high, and because we have nowhere found such clear and concise statements upon this most important point of practice.

*Antimony.*—In the last edition of this work it was stated that tartar emetic, in the dose recommended by some of the highest authorities of the day, had been found by us a very dangerous drug. Time has but confirmed this opinion. At that time we were in the habit of administering it in doses of a forty-fifth or sixtieth of a grain every hour or two hours. This was at a time when Rilliet and Barthez used it in doses of from two to four grains, dissolved in four ounces of water, in twenty-four hours, for very young children, and for those who were older six grains in the same space of time. They continued it for two, three, or four days, and advised its suspension should it give rise to excessive vomiting or severe diarrhœa. Dr. West at that time gave it in doses of one-eighth of a grain, at the age of two years, every ten minutes, until vomiting was produced; to be continued every hour or two afterwards for a period of twenty-four or thirty-six hours. Dr. West had reduced the doses, and the time of continuing it, one-half, between the time referred to and the date of his essay on pneumonia, published in 1843.

The doses used by us, as mentioned above, may seem to some who have not employed them ludicrously small, but we soon found that even they were quite frequently, in certain constitutions, more than could be given with safety. Antimony, even in those small quantities, sometimes caused a very peculiar general prostration. Perhaps without any vomiting whatever, or with only a rare effort at that act, the patient would refuse all nourishment, become very pale and weak, grow limp and motionless, take on a haggard and pinched expression of face, pass into a state in which it would pay no attention to what was going on around, be very peevish and irritable when disturbed, get a very frequent and feeble pulse, and look to an experienced eye as though a very little deeper degree of such prostration might end fatally. After seeing this condition a few times, and finding that the withdrawal of the drug and the use of small doses of brandy (ten to twenty drops in water or milk) every hour or two hours, was followed by rapid improvement, we learned the greatest caution in the use of the remedy. Of late years we never use tartar emetic at all, but give, not unfrequently, in strong and vigorous children, with high febrile heat and rapid circulation, small doses of the precipitated sulphuret of antimony, always watching its effects carefully, and withdrawing it at once should the above symptoms make their appearance. The formula found most useful and safest is the following:

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|---|---|
| ℞.—Antimon. Sulphurat, | gr. j. |
| Pulv. Doveri, | gr. iij. |
| Sacch. Alb., | gr. xij. |

M. et div. in chart. no. xii. One to be given every two, three, or four hours.

To infants under two years of age it is best to give no antimony at all.

*Calomel.*—In former years, in obedience to the prevailing rules of the day, we gave calomel in very moderate quantities in some cases of pneumonia. We never felt sure that it was of any special service, and of latter years have abandoned it altogether. It is one of the drugs which, we think, ought not to be given except under some very clear indication. Such indications rarely exist in pneumonia, and therefore we do not prescribe it.

*Salines.*—Citrate of potash, either in the form of the neutral mixture or dissolved simply in water with a little sugar, is one of the best febrifuges that can be used. In doses of two and a half grains to children over three or four years old, and half a grain to a grain for younger children and infants every two hours, it is an excellent remedy. It may be given alone, or combined with small doses of syrup of ipecacuanha and opium. Spirit of nitrous ether may be added when the urine is scanty. or when the ipecacuanha cannot be borne.

The solution of *acetate of ammonia*, either alone or combined with the spirit of nitrous ether, is useful when the child is feeble, and when the stomach or bowels are irritable, in which case the citrate of potash sometimes offends the stomach and acts upon the bowels. The dose of this remedy may be from twenty or thirty drops to half a drachm or a drachm, according to the age, in sweetened water, or some aromatic water, every two hours.

*Ipecacuanha ; Purgatives.*—Ipecacuanha is preferable to antimony in all conditions except those referred to above. In infants under two years of age, in children of highly nervous temperament, or of feeble and delicate constitutions, in most cases of the secondary form, and in all mild cases, it is much safer than the other drug. The most convenient preparation is the syrup, of which ten drops may be given every two hours at four years of age, five drops between one and three years, and from one to three drops to infants of two or three months. It is often useful to combine the spirit of nitrous ether with it, and, when the stomach is irritable, or the patient very restless and irritable, with small doses of opium. When the patient is much oppressed by the presence of secretions in the bronchia, and not too much prostrated, an emetic is often very useful. Ipecacuanha is the most suitable remedy for this purpose, as it produces less exhaustion and depression than any other, except, perhaps, alum.

A *purgative* dose is useful at the beginning of the attack when the child is constipated, and when the abdomen is tumid and hard. A teaspoonful of castor oil, or two teaspoonfuls of simple syrup of rhubarb, will answer every purpose. After this period cathartics need be used only so as to keep the bowels moderately soluble. If they are moved spontaneously every two or three days, there is no occasion to give purgative doses. If they do not move, a simple enema, or the doses mentioned, will be sufficient. Violent or frequently-repeated doses of purgatives are injurious, by exhausting the patient through the disturbance of the stomach which they occasion, or by setting up diarrhœa.

*External Applications.*—MM. Rilliet and Barthez were of opinion that neither blisters, Burgundy pitch, or tartar emetic plasters, exerted the least influence upon any one of the symptoms of pneumonia, but that, on the contrary, they increased the fever. Dr. West gave up the use of blisters entirely, in consequence of the irritation and fever they occasioned, and because of the disposition to sloughing which he observed to follow their use amongst the poor. At one time we thought we had observed great benefit from the use of a blister when other means had failed to produce some moderation of the symptoms after four or five days. If they are used at all, it ought to be with great care, especially in very young or feeble children, whose nutrition is depraved. In children of less than two or three years old, a blister should never remain on the skin longer than two hours. As a general rule, the mother should be told positively to remove it at the end of one hour and a half, even though the surface be still unchanged. A warm bread-and-milk poultice is then to be used as a dressing, and this rarely fails to cause vesication in a few hours. Employed in this way, we have had but once the misfortune to see a blistered surface slough, and this occurred in a child whose skin had been very much irritated by frictions with amber oil and ammonia.

Since the spring of 1845, however, when we were led to make frequent use of mustard poultices and foot-baths in the treatment of the bronchitis and pneumonia of measles, we have rarely employed blisters, but have preferred the employment several times a day of the remedies just indicated. Two parts of Indian meal and one of mustard, for young children, and for those who are older equal parts of each, are to be mixed with warm water, and spread thickly like a poultice on a piece of flannel or rag five or six inches square. This is to be covered with fine muslin, linen, or gauze, and applied first over the back and then the front of the thorax. It may remain from fifteen to forty minutes, or until the child cries or complains, or until the skin is reddened. The mustard foot-baths may be employed at the same time with the poultices. These applications are useful whenever the oppression is very great, and, when resorted to in the evening, they often allay irritability, and dispose the child to sleep. The number of applications to be made in a day must depend on the urgency of the symptoms. We have employed them from once a day to every two or three hours.

Dr. Chambers (*loc. cit.*) strongly recommends the use of linseed meal poultices, as a "direct restorative means, about the use of which also anywhere you need have no manner of hesitation." He claims that it allays the pain; relieves dyspnœa; induces moisture and activity of the skin; and promotes the absorption of the exudation. He directs the poultice to be spread half an inch thick on a cloth or flannel as broad as the circumference of the thorax, and deep enough to cover the whole chest, from the collar bones to the hypochondria. In adults this will usually keep in place of its own accord, but in children you should have a tape stitched on in front, and a tape behind, which you can tie over the shoulder in the manner of a shoulder-strap.

*Tonics and stimulants* are to be resorted to in cases which manifest undoubted signs of debility. When, therefore, the attack occurs in a feeble child; in secondary cases; when the inflammation remains unresolved after the use of other remedies, and when extensive bronchial respiration persists, though the fever has moderated; or when, in any case, during the acute stage, the child falls into a typhoid state, as shown by pallor of the surface, frequent, uneven pulse, dry tongue, prostration of muscular power, and either incessant jactitation or the listless quiet of exhaustion; attention must be paid to the state of the constitution even more than to the local disease. The vital forces must be sustained and strengthened in order to give time and power to carry on the operation necessary for the removal of the local obstruction. To effect this purpose, we must depend upon the use of food, alcoholic stimuli, and certain tonics. The *food* most suitable for such a condition is milk, animal broths, soft-boiled eggs, and perhaps small quantities of raw or slightly cooked meat. The best stimulants are brandy, given either in the milk or in water, as the child will best take it, and wine and water, or wine-whey. The amount of brandy given may be stated as 3, 4, or 5 teaspoonsfuls in the course of 24 hours at 4 years of age. The best *tonic* to give in conjunction with the alcoholic stimulus is quinia, which should be administered in the quantity of from gr. iv to gr. vj in 24 hours, given in divided doses. When the exhaustion is marked, especially when associated with great embarrassment of respiration, and copious viscid secretion from the bronchial tubes, we should recommend the use of muriate of ammonia in doses of gr. iij every 3 or 4 hours, at 4 or 5 years of age, given in mucilage or in mist. glycyrrhiz. comp.

*Opium* is constantly of great service in the treatment of pneumonia. It should always be used when the patient suffers much, either from the side-pain or from cough, whether this be harassing and exhausting from its mere frequency and persistence, or from its effect in developing the stitch; when there is painful jactitation, an unusual degree of distress and malaise, or marked tendency to morbid vigilance. When the fever is very high, the pulse vibrating, the nerves on a rack, opium is of the greatest advantage. The mere comfort it gives is a good warrant for its use, but it has long seemed to us to aid in shortening the duration, and lessening the severity of the constitutional disturbance.

The choice of the preparation, and the doses and times of administration, must vary in different cases. When used early in the case, to act upon the circulation and allay general irritability, it is best to give it with the febrifuge every two or three hours. When used to control cough, it can be added to the sulphurated antimony in the form of Dover's powder, as already suggested, or to the syrup of ipecacuanha and spirit of nitrous ether, in a liquid form; or, when the cough is particularly troublesome at night, as often happens, it can be given with more advantage in a single dose, or two doses in the evening. The preparations we have found most useful are, laudanum, especially the tr. opii deodorata, paregoric, solution of morphia, or Dover's powder. Under six months of age, half a drop of laudanum, from five to ten drops of paregoric, or two or three drops of the solution of morphia, may be given, and repeated twice or three times in the twenty-four hours, according to the effects. From the age of six months to the end of the second year, these doses may be doubled. In the third and fourth years, two drops of laudanum, ten to twenty of paregoric, five to ten of solution of morphia, may be used several times a day. Where the remedy is given every two or three hours, we have found one drop of laudanum quite enough at the ages last mentioned. When the dose is given only at night, from three to five drops of laudanum, ten to fifteen of solution of morphia, and thirty to fifty of paregoric, are sufficient as a general rule. After the age of four and five years, the doses must be increased in proportion to the age. In very young children, the doses given at first should always be watched with a good deal of care, and never carried to such a quantity, or continued long enough, to induce constant and heavy drowsiness or stupor. In some instances of very nervous and hyperæsthetic children, in whom there is determined, by the violence of the reaction, a degree of irritability of the nervous centres tending to the tetanic state, the doses must be much larger than those mentioned; but here the physician should see the patient himself at least twice, and sometimes three times in the day, to watch and regulate by the dose the exact action of the drug. We have occasionally seen the cough most harassing and exhausting in its effect, occurring almost with every breath, and lasting for twelve and twenty-four hours. Under such circumstances, a mixture like the following has proved most beneficial in our hands:

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|---|---|
| ℞. Tr. Opii Deodorat., | gtt. xxxij. |
| Vin. Antimon., | gtt. xxxij. |
| Ext. Valerian. Fl., | fʒij. |
| Syrup. Simp., | fʒij. |
| Aquæ, | f℥iss.—M. |

Dose, a teaspoonful every hour or two hours, at the age of four years and upwards, until the cough is controlled.

Paregoric, in the proportion of two drachms to half an ounce, in place of the laudanum, sometimes proves more soothing and comforting.

GENERAL MANAGEMENT.—Since the reign of restorative medicine has set in, the general management of the patient has received a degree of attention which it had never attracted before. Under the expectant plan it constitutes, indeed, the chief portion of the treatment. The most important points to be attended to under this head are the diet, drinks, clothing, air, and state of repose.

The patient ought not to be allowed to go entirely without food even in the early days of the disease, neither should there be any effort made to stuff the child with large quantities of nourishment. The appetite is nearly always in great measure abolished, at first, and food is unwillingly taken except in very small quantities. A nursing child must not be allowed to nurse as heartily as usual. If it attempts to do so, it is probably from thirst and not from hunger. Water, therefore, should be offered to it from time to time, and the breast be allowed only every three or four hours for short periods. Weaned children should have only milk, always reduced by the addition of half or a third water, and pure water ought to be given frequently. The thirst in this disease is intense, and the physician should himself see that the patient has water freely. We have seen the most violent and obstinate screaming, and painful restlessness, quieted at once by a copious draught of cold water. In children over two and three years of age, milk and water is still the best food; but when this is refused, thin chicken or beef-tea may be given in doses of a wineglassful or a gill every four hours. After three or four days have passed by, the administration of food is a very important part of the treatment. The child should now be induced, by persuasion and even gentle force, to take a little food at least three or four times in the twenty-four hours. As the severity of the symptoms subsides, the food ought to be increased in quantity.

The clothing ought to be such as to keep the body comfortably warm. In winter, which is the season when the disease almost always occurs, thin and soft flannels ought to be worn, and, when the child is very restless, either in the bed or on the lap, a sack made high in the neck, with the sleeves to the wrists, buttoning in front and consisting of a soft and pliable woollen stuff, ought to be put over the bed-dress.

The room ought to be, if possible, a large one with a high ceiling, well ventilated, warmed by an open fire, and kept at a temperature of 65° to 68°. If the child is very young and delicate, a temperature of 70° is not too high, if only the ventilation be good.

The bed or crib is the proper place for a child with pneumonia. The lap of the mother or nurse is a poor substitute for an even, elastic, and steady mattress. We have long endeavored to keep our little patients in bed. A very young infant must of course often be taken up to be nursed, soothed, or cleansed, but, as soon as possible, it ought to be replaced in the crib. Children a year or two old can generally, with good management, be kept the greater part of the time in bed. Those of three and four years old and upwards ought always to be confined to the bed. A little firmness on the part of the mother will almost always accomplish this end, and it is a highly important one, and well worth even a quarrel at the beginning of the sickness. We have seen a child three years old kept by a weak and over-tender mother and grandmother nursed on the lap for three weeks, until they were exhausted and demoralized, and the child had œdematous feet from their dependent position during so long a time.

Repose and quiet of mind and body, as complete as can be attained, are things of great value, and to secure them a good bed and a cheerful and resolute manner on the part of the nurse are as important for the child as for the adult. It is only in bed, too, that an even temperature and an avoidance of draught can be fully secured. A direction given by some of the French writers, and by Dr. Gerhard, is not to allow very young children to lie for too long a time in one position in bed, or in the nurse's arms, as it is apt to produce a stasis of blood in the dependent portions of the lungs, and thus to maintain or increase the disease. Dr. West recommends, whenever the inflammation has reached an advanced stage, or involved a considerable extent of the lungs, that the patient be moved with great care and gentleness, lest, as he has often seen occur, convulsions be produced.

## ARTICLE III.

### BRONCHITIS.

DEFINITION; SYNONYMES; FREQUENCY; FORMS.—The term bronchitis is now universally employed to express inflammation of the mucous membrane of the bronchia.

It is usually called in this country catarrh, and catarrhal fever. It has been stated, under the head of Pneumonia, that many of the cases known amongst us by the popular term catarrh-fever, are, in fact, cases of pneumonia. We shall on account of this misapplication of names, endeavor to draw the distinction between bronchitis and pneumonia with great care. Bronchitis is not treated of either by Dewees or Underwood. Dr. Eberle confounds it with pneumonia, under the titles of catarrh, catarrhal fever, acute bronchitis, and pleuritis.

Since the distinction between bronchitis and pneumonia has been more carefully drawn in the mortality returns of this city, bronchitis is found to be the cause of a much smaller proportion of deaths than would have formerly appeared.

Thus, during the past seven years, the total mortality from all causes (excluding still-born children) was, at all ages, 105,785; under fifteen years of age, 50,151; and under five years, 43,322. The mortality from bronchitis during this period was, at all ages, 969, or less than 1 per cent. of the entire mortality; under fifteen years, 509 or 1.01 per cent. of the mortality under that age; and under five years, 495, or 1.14 per cent. of the mortality under that age.

It is, however, one of the most frequent of the diseases of childhood, especially during the winter and early spring months. It is said to be more common as a secondary than as an idiopathic disease. Of 115 cases observed by MM. Rilliet and Barthez, only 21 were idiopathic. Of 123 cases, however, that we have recorded, 76 were primary, and the remaining 47 secondary. The diseases during the course of which it is most apt to occur, are pertussis and measles.

We shall describe three forms of the disease: 1, *acute bronchitis* of moderate severity; 2, *acute suffocative bronchitis*, or catarrhus suffocativus, the congestive catarrhal fever described by Eberle and by Dr. Joseph Parrish, of this city; 3, *subacute* or *chronic bronchitis.*

CAUSES.—Amongst the *predisposing* causes of the disease, *age* is one of the most important. MM. Rilliet and Barthez suppose it to be much more common in children over, than in those under five years of age. Of one hundred and fifteen cases observed by them, thirty-seven occurred between the ages of one and five years, and seventy-eight between six and fifteen years of age. It is scarcely fair, however, to compare a period of nine years with one of only four, as is done in the above statements. Of one hundred and twenty cases that we have seen in private practice, in which the age was noted, fifty-four occurred between birth and two years of age; thirty-nine between two and four years; twelve between four and six; six between six and ten; and three between ten and fifteen. Of eighty-one cases under four years of age, of which we have kept an accurate record, eleven occurred in the first half of the first year of life, twenty in the second half, making thirty-one for the first year; twenty-one occurred in the second year of life, nineteen in the third, and ten only in the fourth, showing that the liability is greatest in the first year of life, and particularly in the last half of that year, that it continues very strong in the second and third years, being nearly equal in each of these, and that it then suddenly diminishes. It would seem also that the simple acute, and the acute suffocative forms are most common under six years of age, while the secondary cases occur more frequently after that age.

As to the influence of *sex* on the liability to the disease, it would appear from our experience to be rather more common in girls than boys, since of ninety-nine cases in which this point was noted, fifty-four occurred in girls, and forty-five in boys. The fact of its being more frequently a *secondary* than a *primary* affection, has already been noticed, though this has not been true of our experience. The diseases in which the largest number of cases occur are measles, pertussis, and typhoid fever. The secondary cases are most common, of course, during the prevalence of the diseases whose progress they complicate, whilst the primary cases are most common in the cold months of the year, and especially in the autumn and spring. The reader is referred to the table in the article on pneumonia for a full exhibition of the effects of season and temperature upon the frequency of this disease. Bronchitis is sometimes *epidemic* amongst children as it is amongst adults.

The only *exciting causes* whose effects in the production of the disease seem clearly proved are sudden transitions from a warm into a cold atmosphere, and sometimes the contrary change; prolonged exposure to cold, particularly when combined with moisture; and the inspiration of irritating gases. We believe ourselves, from what we have seen in this city during the last twenty years, that the most fruitful cause of bronchitis, and also of pneumonia, croup, and angina in early life, is the style of dress almost universally used for young children. The dress is entirely insufficient. It consists usually of a small flannel shirt, cut very low in the neck, scarcely covering the shoulders, and without sleeves; of a flannel petticoat, a muslin petticoat, and an outer dress made in nearly every case of cotton. The dress, like the flannel shirt, is cut low in the neck, is without sleeves, and fits very loosely about the chest, so that not only are the whole neck, the shoulders, and the arms exposed to the air, but, in consequence of the looseness of the dress about the neck, it is fair to say that the upper half of the thorax is also without covering. In the infant, from birth to the age of six or eight months, the dress is made long, a wise provision so far as it goes, but from the time the skirts are shortened, up to the age of four or five years in boys, when happily the time for boys' clothes arrives, and, throughout childhood in girls, the trunk of the body and the arms are dressed, or rather, left undressed, as above described. But, not only are the neck, breast, and arms left bare, but in many children the greater part of the legs also are kept uncovered, or, at least, short stockings, scarcely rising above the ankles, and muslin or sometimes Canton flannel drawers, not reaching, or scarcely reaching to the knees, leave exposed to the air a large proportion of the cutaneous surface of the lower extremities. Now, in this dress, the child passes the day in a house, the sitting-rooms of which are heated usually to 68° or 70°, but in which the entries, and sometimes the parlors, are frequently at a temperature of 60°, 50°, or even lower, as we ourselves have tested with the thermometer. And not only are the entries and parlors, and indeed all the rooms, saving the one or two in constant use, frequently at the temperature just mentioned, but the air of the nursery itself is often allowed, through the negligence of the servants, and especially early in the morning, to fall to 60° or 58°, or possibly lower still.

That this style of clothing is not correct, is proved by the simple facts that children who are dressed nearly the same in summer as in winter, suffer scarcely at all from colds in the summer season, when the thermometer seldom ranges below 76°, and is usually above that point; and also by the fact that adults have been driven by long and almost forgotten experience, to wear clothing twice or three times as warm as that which they put upon their children. How constantly do we see the strong and fully-developed man comfortably enveloped in a warm, long-sleeved flannel shirt, woollen or thick cotton drawers, and cloth pantaloons, vest, and coat, in the same room and in the same temperature with the little—often puny, pale, and half-naked—child. But it is almost impossible to make people understand that children need as much clothing as themselves. They always insist upon it that, as the child passes the greater part of the day in the house, it cannot require as much clothing as the adult who is obliged to go out and face the weather; forgetting, or refusing to see, that the former wears less than half, or probably not more than a fourth, as much covering as the latter, and that the adult, when in the house, and in the same rooms as the child, finds his one-half or three-fourths warmer clothing not at all superabundant or oppressive.

We have repeatedly had patients to get well of chronic catarrhal and laryngeal coughs, and to cease to have, as before, frequent recurrences of these disorders, under the simple treatment of a long-sleeved and high-necked merino or flannel shirt; long woollen stockings, and stout Canton flannel drawers coming down below the knees; and that, too, after the most patient and assiduous, and sometimes over assiduous trials of drugs, diet, and confinement to the house, had entirely failed of any permanent good effects. The fact is, that though there are some few children who can bear the dress above-described without injury, there are a great many more who, while they wear it, either suffer all winter long from frequently-repeated attacks of cold, in the shape of croup, chronic laryngeal irritation with cough, chronic pharyngitis, bronchitis, acute or chronic, or more rarely pneumonia; or, if they escape these direct effects, resulting from the constant and rapid waste of their caloric, they are rendered more pale, thin, and delicate-looking than they would be were their vital forces husbanded by warm clothing, instead of being wasted in the constant struggle to keep up the heat of the uncovered body at the natural point.

ANATOMICAL LESIONS.—We shall describe, first, the lesions met with in cases in which the disease is confined to the larger bronchia, the inflammation not extending into the capillary tubes; and next, those observed in cases in which the disease has attacked the capillary bronchia. The former are those which constitute the form designated under the title of acute, ordinary bronchitis, of moderate severity, while the latter are those to which the term capillary has been applied. Patients seldom die of the first-named variety of the disease alone, but as it often occurs as an accidental complication, or a more or less essential part of different severe and frequently fatal diseases, the morbid alterations which characterize it, have been very thoroughly studied and ascertained.

The morbid alterations of *acute ordinary bronchitis* always exist in both lungs, and are confined to the larger bronchia, ceasing on a line with the smaller tubes and the capillary divisions. The most constant alteration is redness of the bronchial mucous membrane, caused by injection of the minute vessels of that and the subjacent tissues, and varying in shade from a rosy to a bright-red or brownish tint. The mucous membrane is sometimes softened, a change which can be ascertained only in the largest tubes, and it sometimes presents a thickened, unequal, and rough appearance. Ulcerations are very rare. The inflamed bronchia contain a more or less abundant viscid, transparent, or opaque yellowish mucus.

In *capillary bronchitis* the alterations of the mucous membrane of the capillary tubes, do not always reveal the existence of the disease. That membrane is sometimes pale in the minute ramifications, and exhibits morbid changes only in those of medium size. The alterations of the membrane consist in redness, which is made up either of a number of fine points, seated in the membrane itself, or of arborizations seated both in the membrane and the cellular tissue beneath; it sometimes presents a granulated appearance, and it may be more or less thickened, and its consistence diminished. The bronchia are usually filled and almost obliterated from the secondary divisions to the final ramifications, by a substance of a yellowish-white or yellow color, non-aerated, and composed of a thick muco-pus. Portions of false membrane are sometimes, not as a rule, but exceptionally, found mixed with the secretions just described, while in other instances false membranes alone are present in certain tubes. The false membrane may exist in the form of patches, or it may constitute a lining to the whole extent of the bronchial ramifications. It is usually soft and but slightly adherent, and the mucous membrane beneath is either very pale and of its usual consistence, or red, softened, and rough. The different kinds of secretion are commonly most abundant in the bronchia of the inferior lobes.

In a good many of the cases, another lesion, dilatation of the bronchia, is also found upon examination. This alteration evidently occurs under the influence of the inflammation; it may affect either the length of the air-tubes, or only their extremities. In the former condition the tube continues of the same size, or becomes gradually larger from one of its early subdivisions, until it reaches the surface of the lung. In the latter condition a section of the lung presents an areolar appearance, from the presence of a multitude of little rounded cavities, communicating with each other and with the bronchia, of which they seem to be a continuation. These cavities are generally central, though they are sometimes found upon the surface of the lung, in which case they are formed of the pleura, lined by the thinned membranes of the dilated bronchus.

The fact of these cavities being true dilatations of the bronchia, has been called in question by Dr. Gairdner (*loc. cit.*, p. 76), who believes, on emphysema. Dr. Gairdner, as already mentioned, describes them as abscesses, and states that they "unquestionably arise from the accumulation of pus primarily in the extreme bronchial tubes of the collapsed lobules." This view, which is closely similar to that of MM. Barrier, and Legendre and Bailly, is, it appears to us, much the most reasonable that has been adduced.

MM. Rilliet and Barthez, in their second edition, as has already been stated, in the article on post-natal collapse, describe at great length a state of *congestion* of the lung-tissue, as a most important element in the anatomical alterations of the bronchitic diseases. This congestion usually assumes one of two forms: it may be distinctly lobular, consisting then of disseminated patches, or, as more generally happens, large numbers of contiguous lobules are affected, when it takes the form of generalized lobular congestion. These congested portions of the lung are almost always attended with more or less well-marked collapse of the vesicles, so that there is associated together the conditions of congestion and collapse. It is this combination of bronchitis with congestion and collapse, which was formerly described by them, under the titles of lobular and generalized lobular pneumonia. The alteration to which the term carnification has been applied, and which not unfrequently coexists with bronchitis, they regard as different from the above, and as consisting in a simple collapse of the lung-tissue, without the active or passive congestion which exists in the first form. The principal causes of this condition are, according to them, debility and catarrh. The signs of catarrhal inflammation are, they state, never scarcely absent. In only four out of thirty-one cases did they fail to discover them.

The parenchyma of the lung presents, in bronchitis, different appearances in different cases. It is supple, crepitant, and of a rose-gray color, but does not collapse, especially the anterior portions, when the thorax is opened, as does healthy lung. This imperfect collapse depends either on the fact that the thick mucus and muco-pus which fill and obstruct the bronchia, prevent the contained air from being expelled by the natural elasticity of the lung, or, when no secretions exist to produce this effect, on the loss of the natural elasticity of the organ. Another cause is the existence of vesicular emphysema, a lesion observed to a greater or less extent in nearly all the cases, and affecting usually the summit of the lung, its anterior edge, and also its posterior or lateral edge. In a large number of cases, and particularly in those occurring in young children and in weakly and debilitated subjects of all ages, the tissue surrounding the diseased bronchia exhibits the condition which has already been fully described in the article on atelectasis, under the title of collapse of the lung. The extent and mode of distribution of this lesion, its peculiar and distinguishing characters, its causes and mode of production, and the method of treating it, have been carefully treated in the article just referred to, and we shall make no further allusion to it, in this place, except to beg the reader, who is not already fully acquainted with it in all its bearings, not to suppose himself master of the subject of bronchitis until he has also fully studied that of collapse, as the two go together so constantly, and the latter is practically so important, especially in children, as to make it essential for him to understand both.

The lesions just described as characteristic of acute bronchitis, are also met with in the *chronic* form of the disease. The dilatation of the air-tubes, however, presents different features. The calibre of the enlarged tube is often much greater, its walls are whitish and uneven, and cry under the scalpel, and beneath the mucous lining may be seen hypertrophied transverse fibres. The mucous membrane itself remains smooth and polished, while the tissues beneath are thickened and hypertrophied.

SYMPTOMS; COURSE OF THE DISEASE; DURATION.—Acute simple bronchitis exhibits very different degrees of severity in different cases, being in some extremely mild and benign, and in others so much more severe, as to border closely on the capillary form of the disease. In its mildest form, it occasions merely slight cough and stuffing, a little mucous râle over the larger bronchia, with a total absence of dyspnœa, or of decided fever. In cases rather more severe than this, it begins with a moderately frequent cough, which, dry at first, soon becomes loose, and is neither paroxysmal nor painful. The expression of the face remains natural, with the exception of an appearance of slight languor. The pulse and respiration are but slightly accelerated; the external phenomena of the latter, an important means of diagnosis in infants, remain natural; it occurs without jerking, the rhythm continues even and regular, and there is no violent action of the alæ nasi. The percussion is not modified. Auscultation reveals in very young children a mixture of mucous and sibilant râles on both sides, which come and go, and are of short duration; in older children, the moist râles predominate, and commonly last several days. These sounds are seated in the larger bronchia. The temper of the child is not much changed; the appetite is not entirely lost; there is neither vomiting nor diarrhœa; and the fever is usually slight. The disease remains nearly stationary, or increases for a variable length of time, after which the cough becomes looser, and in children over five years of age, is sometimes attended with expectoration of frothy or yellowish mucous sputa, whilst under that age there is no expectoration. The fever and other symptoms, with the exception of the cough, now subside; the cough remains some days longer.

In attacks still more severe than this, the symptoms resemble very much those just now described, but they are all more intense. The cough is tighter, more frequent, harassing, and especially it is more painful, as shown by the fact that the child cries and complains, and that a marked expression of pain passes over the face at the instant of coughing. There is more fever, the skin being hot and dry, and the pulse more frequent, rising often to 130 or 140, and in one case to 156. The respiration is hurried, and though not attended with the same labor and anxiety as in the capillary variety, it is evidently oppressed; it counted in three cases, 60, 60, and 62. There is more restlessness, fretfulness, and general distress; the appetite is greatly diminished or lost, and infants nurse with less avidity than usual, or refuse to nurse at all for several hours together. In cases of this kind, the physical signs are more decided than in those of milder degree, there being a greater abundance of mucous and dry râles, and generally some subcrepitant râle, and they are heard over a larger extent of surface, usually over the lower half, two-thirds, or even the whole dorsum of the chest. The symptoms are almost always most marked and severe in the after-part of the day and night. Very often the patient will be comparatively easy and comfortable in the morning, but as the day goes on, he becomes more feverish, restless, and fretful: the cough grows more troublesome, more frequent, and tighter; the breathing is quicker and more oppressed; the face is more flushed; the sleep is broken and disturbed, and the child may appear through the night quite ill; and yet as morning approaches, the symptoms moderate, the skin often softens and becomes moist, and the whole aspect of the case shows a great amelioration in the manifestations of the disease.[1]

The *duration* of this form of bronchitis is very uncertain; the idiopathic cases last usually from four to seven or eight days, though they may last from sixteen to twenty-five; the duration of the secondary cases depends, in great measure, on the nature of the diseases during which they occur.

In any of these different degrees of acute simple bronchitis, the patient is liable, especially if it be a weak and debilitated child, or a young infant, to sudden and alarming aggravations of the symptoms. The breathing becomes suddenly either greatly increased in frequency, or excessively labored and oppressed, the surface becomes pale, the expression dull and languid, or distressed, the child is drowsy and inattentive, or uneasy and restless, the hands and feet are coolish, the act of sucking is performed with difficulty, or the child refuses the breast entirely, and it is evident that, from some sudden change in the condition of the lungs, the act of respiration and the aeration of the blood are very seriously interfered with. If this sudden aggravation of the symptoms be unattended with a corresponding increase of the febrile phenomena, as marked by greater heat of skin and augmented action of the circulation, it is altogether probable that it depends on a collapse of larger or smaller portions of the pulmonary texture, and if, on examination, we discover dulness on percussion, distant bronchial respiration, and cessation, or greatly diminished abundance of the bronchitic râles, over parts of the chest where a few hours or a day before there had existed all the physical signs of bronchitis, there can be no longer any doubt as to the cause of the suddenly increased severity of the symptoms,—it must be owing to collapse.

*Acute suffocative bronchitis*, *capillary bronchitis*, or the congestive catarrhal fever of Parrish and Eberle, and the suffocative catarrh, or bronchial croup of other writers, may succeed to the form just described, or appear as an idiopathic affection. Under either condition the general symptoms are more threatening than in the preceding form, and the disease soon assumes all the appearances of great severity. The child is very uneasy and restless, constantly changing its position, moving about in the crib or bed, or insisting upon being changed from the bed to the lap, or from the lap to the bed. In one case that came under our charge the oppression was very great, and the only position in which the child was at all satisfied was resting on the mother's arms, with the front of its chest applied against the mother's breast, and the head hanging over her shoulder. The expression of the face is anxious and disturbed, and its color usually pale or slightly bluish. The temper is irritable or subdued; the child hates to be disturbed, and generally chooses its own position. The respiration is very much accelerated, running up in a very short time to 60, 70, or 80, and it is usually more or less irregular, and evidently laborious and difficult. The cough is very frequent, troublesome, and evidently painful; it occurs in short paroxysms usually, with or without stridulous sound, is at first dry, and after a few days is accompanied, in older children, by whitish or yellowish expectoration. In some instances, the sputa consist of mucus tinged with blood, or of pure blood even, and still more rarely of mucus mingled with small shreds of false membrane. The appetite is entirely lost; the tongue is usually moist and furred white; there is acute thirst, and yet, in severe cases, though the presence of acute thirst is evident from the manner of the child, only very small quantities of water are taken, from the impossibility of suspending the respiration long enough to allow of more being swallowed; the drink is gulped rapidly, suddenly, and with great difficulty, and after a time is refused almost entirely from this cause. In children old enough to talk, the speech is short and abrupt; the patient dislikes to speak, from the fact that the effort obliges it to suspend momentarily the act of breathing. Fever sets in from an early period; the skin is hot and dry, and the face is flushed at first, though it soon becomes pale in most cases, from the approach of an asphyctic state. The pulse becomes frequent, rising soon after the onset to 130, 140, 150, or higher; it is full and hard early in the attack. The resonance on percussion is not modified. Auscultation reveals at first sibilant râle, mixed with some mucous rhonchus; but soon a fine subcrepitant râle is heard over all the lower parts of both lungs behind, and approaching, sometimes, over the bases of the lungs, the character of crepitus. After a time the subcrepitant râle is heard over the whole, or nearly the whole dorsum of the chest, and to a greater or less extent, though not so well marked as behind, over the anterior regions of the thorax. This râle is audible at first both in inspiration and expiration, and is very distinct, but at a later period, it is heard only in the inspiration, or there is substituted for it a mucous râle, while the subcrepitant râle is now heard only in the forced inspirations during coughing or crying. These râles are fugitive and irregular, disappearing or changing from one to the other after fits of coughing.

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[1] According to Handfield Jones, this almost invariable tendency to aggravation of catarrhal disorders during the night is due to a lowering of the nerve-power, the vaso-motor nerves partaking of the general debility, and thus allowing dilatation of the arteries, and causing increased hyperæmia of the affected parts with more abundant exudation.

Should the case not take a favorable turn, which change would be indicated by a moderation in the symptoms just detailed, and especially by easier and fuller respiration, with diminution of the amount of the subcrepitant râle, and return of the natural respiratory murmur over some parts of the chest, the symptoms look still more alarming. The oppression becomes excessive; fits of dyspnœa occur, in which the child is extremely restless and distressed, tossing itself about on the bed; the respiration runs up to 80, 90, or more, in the minute, and is attended with violent action of the alæ nasi; the pulse grows more and more frequent, rising to 150 or 180, and it loses force and volume; and the face assumes a whitish or slightly bluish tint, looks puffed, and is sometimes covered with perspiration. As the fatal termination approaches more nearly, the pulse becomes small, thready, and irregular; the respiration is uneven, irregular, stertorous, and often slower than before; the cough is smothered and less frequent; the restlessness generally diminishes, and the child sinks into quiet, and often becomes comatose: the paroxysms of suffocation are less frequently renewed, and less violent, and death occurs in a state of quiet insensibility, or is preceded by partial or general convulsive movements.

The *duration* of this form may be stated to be, on the average, between five and eight days. It may, however, end fatally in a much shorter time. In an example that we saw, in a child four months and a half old, death occurred in twenty-six hours from the onset. Dr. Eberle states that it seldom lasts longer than two or three days, and that in very young infants death sometimes occurs on the first day. M. Bouchut gives us the duration in children at the breast, from two days to a week. Dr. West mentions a case that proved fatal in less than forty-eight hours. In the favorable cases that we have seen the duration was seven, eight, and ten days.

*Subacute and chronic bronchitis* generally follows one of the acute forms of the disease. The character and severity of the symptoms vary very much in different cases. We have known some children to present for several months together, in the winter season, slight bronchitic symptoms, consisting in wheezing and somewhat accelerated breathing; cough, more or less frequent; occasional feverishness, especially at night; some diminution of appetite and loss of flesh; and sibilant and sonorous with mucous râles, heard here and there, but still without severe symptoms during the greater part of the time. Children laboring under this kind of bronchitic irritation are liable to, and generally have, from time to time, more or less sharp attacks of acute bronchitis, in which they present the usual symptoms of that form of the disease. These attacks are very apt to occur coincidently with changes in the weather, and in some patients the liability to them is so great, from the excessive susceptibility of the system to the weather, that no care will prevent them. In some instances, we are very sure that an aggravation of the symptoms of the chronic form constantly occurs whenever the child is about cutting additional teeth, whilst in the intervals between the appearance of the successive teeth, the child remains comparatively well. We believe that the cause of the aggravation, at the moment of cutting the teeth, is to be looked for, not in the act of dentition itself, but in the circumstance that the liability to cold is greatly increased at that particular moment, probably because the forces of the system are so weakened by the effort of the dentition as to lessen the power of resistance against the disturbing influence of a changing, and particularly of a falling temperature.

Cases of the mild kind of chronic bronchitis that we have just been describing, usually get well under proper medical, and especially under proper hygienic means, after several weeks or two or three months; while in other instances the disorder continues, in spite of every precaution, throughout the winter and spring, and only ceases as the warm summer months arrive. We have known the same disposition to show itself again in the following winter. In other instances again, the frequent attacks of severe bronchitis, together with the effect of a constant slight bronchitic inflammation, ends in the production of an emphysematous state of parts of the lung, and the child exhibits more or less marked asthmatic symptoms, which show themselves whenever a slight increase of the bronchitis occurs, and whenever the digestive system is deranged by imprudence in diet or other causes.

In other examples of chronic bronchitis the symptoms are much more severe. These cases almost always follow an acute attack of the disease. The frequency of the respiration and the attacks of dyspnœa persist; the cough is loose and paroxysmal, and the pulse frequent and small; evening exacerbations of fever take place, and the face and sometimes the rest of the surface are often covered with perspiration. Auscultation reveals tubal blowing, with mucous or loud sonorous rhonchus, which seem to indicate the presence of dilatation of the bronchia. Emaciation makes rapid progress, the face is pale and blanched, the eyes sunken, the nostrils are covered with mucous or bloody crusts, and the lips ulcerated. Strength diminishes progressively; the appetite is lost, and the thirst acute; colliquative diarrhœa appears; and after twenty, forty, or more days, the child perishes in the last stage of marasmus. This form of bronchitis often simulates phthisis very closely, and may last for a long time, even several years. It rarely occurs under the age of five years. The expectoration consists of purulent or pseudo-membranous secretions in variable quantity.

PARTICULAR SYMPTOMS—PHYSICAL SIGNS.—The *dry râles* are amongst the most frequent alterations of the respiratory sound in bronchitis. They may be sibilant or sonorous; they seldom exist alone, but are accompanied with mucous râle, and diminish as the latter becomes more abundant. As the dry râles cease to be heard, they are replaced by mucous or subcrepitant râles, or by feebleness of the respiratory murmur. The sibilant râle is often heard over the whole thorax, though it may be confined to the posterior portions. It is not restricted to cases of inflammation of the larger bronchia only, but is also present in capillary bronchitis.

*Humid Râles.*—Mucous and subcrepitant râles do not exist in all cases without exception, as they may be absent in such as are very mild. They may generally be heard over both sides behind, more rarely over the whole of the chest, and almost always both in inspiration and expiration. They are generally persistent, but are sometimes suspended for a moment and replaced by sibilant rhonchus or feeble respiratory sound. Their duration is in proportion to that of the disease.

*Feeble respiratory murmur* is sometimes observed. It is not permanent, occurs during the interruptions of the subcrepitant or sonorous râle, and does not occupy the whole extent of the thorax, but is limited: it is intermittent, and is not accompanied by diminished resonance.

When dilatation of the bronchia exists to a considerable extent it gives rise to bronchial or even cavernous respiration, and to bronchial resonance of the voice, cry, and cough. The bronchial respiration differs from that of pneumonia by its tone, and by its intermitting. The *percussion* is generally sonorous.

It has already been stated in the account of the symptoms that it happened not unfrequently in severe bronchitis, and also in mild bronchitis occurring in debilitated children, that the respiratory sound suddenly became feeble, or even entirely suppressed, over parts of the lung, while in other instances a distant and imperfectly marked bronchial respiration takes the place of the natural vesicular murmur. These changes are heard either over small disseminated points of the lung, or over large surfaces; they are associated with more or less evident dulness on percussion, and what particularly characterizes them, they are very fugitive, being present at one examination, and absent perhaps at the next. The appearance of these changes in the phenomena afforded by auscultation. were formerly thought to indicate the occurrence of pneumonia, and especially of lobular pneumonia; they are now much more satisfactorily explained by the supposition that they depend on diffused or lobular collapse of the tissue of the lungs.

The physical signs above described are not invariably present in bronchitis. Cases do occur, though they are very rare, in which auscultation fails to reveal the presence of the disease.

Rational Symptoms.—The rational symptoms are of the utmost importance in informing us of the degree of severity of the attack.

*Cough* generally exists from the beginning, being in mild cases more or less frequent, and either dry or loose, while in severe cases it is frequent or very frequent, at first dry and then moist, and very rarely hoarse. In acute capillary bronchitis, the cough has a peculiar character. From the first day it occurs in short paroxysms, lasting from a quarter to half a minute. The paroxysms vary greatly in violence, occur at irregular intervals, and generally continue without interruption to the fatal termination, though they are sometimes replaced by simple loose cough a few days before that event. The cough is rarely painful, so long as the inflammation remains simple. Expectoration is never present in very young children. When it occurs in those over five years of age, it consists, in the mild form, of a sero-mucous or of a frothy and yellowish mucous liquid. In general bronchitis it is sero-mucous at first, becoming after a few days yellowish and more or less viscous; it is sometimes nummular, and sometimes amorphous.

In the capillary form, as already mentioned, the sputa consist of mucus tinged with blood, or of pure blood even, and in some rare cases there are mixed with the mucus, shreds of false membrane which may present the form of casts of the minute ramifications of the bronchial tubes.

The *respiration* varies in its characters according to the extent and violence of the disease. In mild cases, it is not much increased in frequency, being generally between 28 and 40 in the minute. In more violent cases, and particularly when the disease implicates the smaller bronchia, it becomes very frequent. The acceleration is slight in the beginning, but increases regularly as the case progresses; thus it may be 30 at first, and rise afterwards to 50, 60, 80, and even 90. When not very much quickened, it remains even and regular; when more so, it becomes somewhat laborious, and the movements of the chest are full and ample; in severe cases, attended with much dyspnœa, it is often irregular, or assumes the characters to which M. Bouchut has applied the term *expiratory*, that is, the order of the movements is inverted, each respiration beginning with the expiration, leaving a pause between the inspiration and expiration, instead of between the expiration and inspiration. In chronic bronchitis with copious purulent or pseudo-membranous expectoration, the dyspnœa is generally habitual.

*Fever.*—The fever is slight in mild cases, the pulse rising very little above its natural standard. The heat is not great, and the febrile movement usually subsides before the termination of the disease. In the grave or capillary form, on the contrary, the pulse is always frequent, and continues to increase in rapidity as the disease advances. It varies between 104, 120, 160, and in very violent cases, rises as high as 200. Early in the attack, it is vibrating, rather full and regular, whilst in fatal cases, it always becomes small, irregular, trembling, and unequal. The skin is generally hot in proportion to the activity of the pulse, except towards the termination, when the extremities often become cool. It is almost always dry. In very young children it is often pale and cold, and covered with perspiration from the beginning.

The *expression* of the face is unchanged in mild cases, but when the disease is violent and extensive, becomes deeply altered after a few days. The eyes are then surrounded by bluish rings, and the expression is uneasy, anxious, and sometimes, but less frequently, exhibits an appearance of profound exhaustion. The anxiety of the countenance increases with the oppression; the alæ nasi are dilated, the nostrils dry or incrusted, and the lips and face, which are extremely pale or momentarily congested, assume a purple tint, particularly after the paroxysms of cough.

The *decubitus* is indifferent at first, but as the disease progresses, the child lies with its thorax more or less elevated, or is restless and constantly changing its position.

In dangerous cases there is great *distress* and *restlessness* after the first few days, or even from the beginning. In some instances the irritability and peevishness are excessive and uncontrollable, while in others there is heaviness and somnolence, especially towards the termination of fatal cases. Some of the disorders of the nervous system just mentioned are present in all the grave cases.

*Digestive Organs.*—There is moderate *thirst* and incomplete *anorexia* when the disease is mild, but, when severe, the thirst is generally acute, and the appetite entirely lost. The state of the bowels varies. The *tongue* and *abdomen* present no special characters in idiopathic cases.

*Urine.*—The great majority of recorded observations of the condition of this excretion in bronchitis, relate to the disease as occurring in the adult. The following summary is taken from Parkes: the condition of the urine in bronchitis varies greatly with the grade of the disease; in the grave forms, it resembles that of pneumonia, the urea being increased, and the chloride of sodium at times entirely absent. The urine has also been quite frequently found to be temporarily albuminous in such cases.

DIAGNOSIS.—The mild form of bronchitis, in which the inflammation is confined to the larger bronchia, is not likely to be mistaken for anything but the early stage of hooping-cough. The diagnosis can be made only by attention to the different characters of the cough, which is more spasmodic and paroxysmal in pertussis, by the absence of fever in that disease, and by the development of the peculiar symptoms of each, as the case progresses. The diagnosis between bronchitis and pneumonia is seldom difficult, except when the latter is grafted upon the former, or in cases of partial pneumonia, attended with bronchitis. In well-marked cases of the two diseases, there can be no difficulty. The restriction of the physical signs to one side alone of the chest in pneumonia, the peculiar crepitus of that disease, or when this is not heard, the fineness of the subcrepitant râle, limited to the upper or lower regions of one lung, the bronchial respiration and bronchophony, the dulness on percussion over the seat of disease, the greater sharpness and severity and the different location of the pain, the more acute character of the febrile reaction, as marked by the pulse, skin, and thirst, and the kind of expectoration, when there is any, will always enable us to distinguish the two with almost absolute certainty. In cases, however, in which the two are combined, the diagnosis is not so easy, but even here the presence of dulness on percussion, and of crepitant or fine subcrepitant râle, or, when these are absent, of pure metallic bronchial respiration with bronchophony, over limited portions of the lung, will generally render the matter clear.

The *sudden* supervention of dulness on percussion over large portions of one of the lobes of a lung, or over disseminated patches, with feeble or absent respiratory sound, or with muffled and distant bronchial respiration, generally indicates the occurrence of collapse in the part of the lung over which these signs exist; and when these symptoms show themselves without any increase in the severity of the febrile reaction, but rather with a diminution, there is every reason to suppose that they depend, not upon inflammatory condensation of the parenchyma of the lung, but upon simple collapse, from the presence of obstructive secretions in the bronchia.

Dr. Gairdner (*loc. cit.*, p. 6) has called attention to a difference in the character of the dyspnœa in the two diseases, which is, we think, of considerable importance, and which we have often remarked ourselves. In bronchitis, of any considerable severity, the respiration is always evidently laborious; it is performed only with the aid of all the accessory muscles of respiration, and in really severe cases it is laborious, the inspiration being long-drawn, exhausting, and inadequate. The dyspnœa of *pure* pneumonia is, on the other hand, quite different. It is merely an "acceleration of the respiration, without any of the heaving or straining inspiration observed in bronchitis, or in cases where the two diseases are combined." Dr. Gairdner states that he has repeatedly seen patients affected with a great extent of pneumonia of both lungs, in whom the extreme lividity and rapid respiration, numbering fifty or sixty in the minute, showed, infallibly, the amount to which the function of the lung was interfered with, who, nevertheless, lay quietly in bed, breathing without any of the violent effort, or disposition to assume the erect posture, so constantly accompanying the more dangerous forms of bronchitis. In children these differences are even more marked than in adults.

Chronic bronchitis may be mistaken for tuberculosis of the lungs or of the bronchial glands. The distinction can be made only by careful study of the history of the case, and of the phenomena afforded by auscultation and percussion, which are detailed in our article on tuberculosis.

Prognosis.—Bronchitis is rarely a fatal disease, so long as it remains confined to the larger bronchia, constituting the acute simple form, of moderate severity. Capillary bronchitis is, on the contrary, a very dangerous affection at all times and at all ages. Even ordinary, simple bronchitis, however, may prove fatal in young infants, and in debilitated children of all ages, from the supervention of collapse of portions of the pulmonary tissue; and it is necessary, therefore, that the prognosis given should always be guarded, when the disease occurs under either of these two conditions. The prognosis differs also in the primary and secondary forms of the disease, since, as might be expected, the danger is much greater in the latter than in the former variety.

We have met with a large number of cases of bronchitis, out of which we have kept more or less copious notes of 123. Of these, 108 were mild, and 15 capillary. Of the 108 mild cases, 65 were primary, all of which recovered; and 43 secondary, of which 2 died. Of the 15 capillary cases, 11 were primary, of which one died, and 4 secondary, of which 2 died. Of the whole number, 123 in all, 5 proved fatal. The danger from the disease depends very much also upon the hygienic conditions in which the patients are placed. In hospitals and amongst the poor it is much more dangerous than in private practice amongst the easy classes of society. This is shown by the fact that all the cases of the capillary form observed by MM. Rilliet and Barthez, and Fauvel, in hospital practice, proved fatal, while of 15 cases seen by ourselves, in private practice, under the most favorable hygienic conditions, only 3 died.

The symptoms indicating great danger are, increase of the dyspnœa, extreme anxiety, small and irregular pulse, coolness or coldness of the skin, with clammy sweats, much jactitation, and delirium, drowsiness, or coma. With such symptoms the danger is greater and the fatal termination more imminent in proportion as the child is younger, less robust, and its constitution exhausted by preceding or coincident disease.

TREATMENT.—The acute simple form of bronchitis is frequently so mild as to need no other treatment than careful attention to the hygienic condition of the patient, and the administration of some simple febrifuge and expectorant. The child ought to be confined to one room, in a mild and uniform temperature, and should be kept quiet until the development of the symptoms shows what is to be the type of the attack. The degree of repose of the body necessary will depend on the presence or absence of fever. We believe that the practice of keeping the body quiet in all febrile disorders, is one of the most important therapeutic means we have. It is long since one of us, having seen his father insist upon putting children to bed for a feverish cold, began to follow the same practice. Time and experience have made even more clear to us the wisdom of the practice, especially in regard to very young children.

So soon as the attack of bronchitis becomes severe enough to cause fever, whether the fever be continuous or occur only in the afternoon and night, the patient ought to be confined to the lap or bed. Suckling children, and those under three years of age, must be allowed to lie on the lap at times, but even they may be taught, very early, to rest quietly in the crib the greater part of the twenty-four hours. Children over three years old can almost always be taught to stay in their beds by a little management and authority, if only the parent is resolute. If not very sick, they should have a large pillow put up against the head of the crib or bed, and against this they should be placed in a sitting posture, with the bedclothes arranged over the lap; and, in cool or cold weather, with a light flannel sack over the night-dress. Here they ought to be kept all day, allowed to change their positions as they wish, and they should be kept as cheerful and happy as possible with toys, books, pictures, readings, tale-telling, or what not. Under such circumstances, a new and interesting toy will often do more good by far than any drug in the materia medica. We have often been surprised, and delighted, too, to find a bronchitis which had been hanging over a young child for several days or a week, getting gradually worse, day by day, under the trotting-about system, begin to mend from the day the child was put to bed, and disappear in two or three days, and that, too, without any change in the other remedies.

The clothing ought to be warm, and yet not sufficient to produce free perspiration, as this, by sudden exposure and evaporation, often induces chilliness. The diet must be simple, and may consist of any of the milk preparations, with or without bread, or bread and butter. Light soups in the middle of the day, or roast potatoes or apples, with bread, may generally be allowed.

As for medicines, in this mild form they are of comparatively little consequence, if the above measures be carried out. In the after-part of the day, when fever sets in, we may prescribe a febrifuge of citrate of potash such as the following, for children of two to four years old:

℞.—Potass. Citrat., . . . . . . ʒj.
Syrup. Ipecac., . . . . . . fʒj vel ʒij.
Tr. Opii Camph., . . . . . . fʒj vel ʒij.
Syrup. Simp., . . . . . . f℥ss.
Aquæ, . . . . . . . . . ad f℥iij.—M.
A teaspoonful every two or three hours.

This should be given until the child sleeps, and occasionally in the night if there be cough and restlessness. At six months of age, the following may be used in the same manner:

℞.—Syrup. Ipecac.,
Tr. Opii Camph., āā . . . . . fʒss.
Spts. Æther. Nitros., vel
Liq. Ammon. Acetat., . . . . . fʒij.
Syrup. Simp., . . . . . . fʒv.
Aquæ, . . . . . . . . f℥ij.—M.
Give a teaspoonful every two hours.

If the fever is very slight, and the cough only moderately severe, it is often well to use no drug through the day, but to give in the evening, two hours before bedtime, and again at bedtime, some simple expectorant and anodyne. Thus at two or three months of age, three to five drops of syrup of ipecacuanha with five of paregoric, or half a drop to a drop of laudanum; at one or two years, ten drops of the syrup with ten to twenty of paregoric, or two of laudanum; at five to ten years, ten to twenty drops of the syrup, with twenty to thirty of paregoric or five of laudanum. The laudanum is often better than paregoric, as it produces a more decided and lasting impression on the nervous system, and appears to extend its useful control over the symptoms further into the following day.

In this very mild form there is no necessity for giving active purgatives. If the bowels are moved once in the day, or once in two days, it is best not to interfere with them. If, however, the patient be constipated, a little simple syrup of rhubarb, a teaspoonful of castor oil, or an enema, will be quite sufficient. A warm foot-bath, containing salt, or, better, mustard, in the evening, will often assist in moderating the cough and promoting quiet sleep.

When, in this acute form, the symptoms assume greater severity, when signs of reaction are prominent, the dyspnœa considerable, and the cough frequent and harassing, it was formerly quite the custom to employ depletion. In the last edition of this work, it was stated that the abstraction of a few ounces of blood by leeching or cupping, was allowable under these circumstances, but that a large majority of such cases would do perfectly well without bloodletting of any kind. We now believe that such practice is unnecessary in any of this class of cases. Attention to hygienic measures is, however, even more important than in the milder cases. Confinement to the bed ought to be a positive rule in such cases. If the bowels are not freely moved, a dose of castor oil, rhubarb, or magnesia should be given, and the patient then put upon the use of one of the febrifuge mixtures recommended above. When the fever is very high, and the patient over a year old, antimonial wine may be substituted, with advantage, for the syrup of ipecacuanha.

If, as the case progresses, the bronchial secretions become very abundant and the dyspnœa severe, the proper remedy is an emetic. This may be ipecacuanha, either in powder or syrup, or a teaspoonful of powdered alum, to be repeated if necessary, in ten or fifteen minutes. The latter substance is, as we have stated under the head of croup, a very certain. efficient, and safe emetic.

Great benefit may be obtained in all forms of bronchitis, from the more or less frequent application of mustard poultices to the front or back of the thorax, and from mustard foot-baths.

The mercurial preparations, so much recommended by many of the English and by some of our own writers, are, in our opinion, very seldom. if ever, necessary in this, or indeed, in any of the forms of bronchitis in children.

MM. Rilliet and Barthez recommend, when the cough and sibilant râle persist after the disappearance of the febrile symptoms, the use of small doses of the flowers of sulphur. We have ourselves known this remedy to prove of service in such cases. About four grains may be given every three hours to a child four years old.

The treatment of the *grave acute* or *capillary form* of this disease brings up again the question of bloodletting. We, like all the rest of the world. have abandoned the practice as a rule, but we think that when, in a case of the kind now under consideration, the age being over two years. the oppression is very great, the right heart laboring, as shown by a congested surface and a throbbing cardiac impulse at the base and left edge of the sternum, and the strength not too much reduced, the abstraction of from two to four ounces of blood from the interscapular space by cups or leeches, would be a useful and legitimate practice. We venture to give this advice from our own past experience, and from the views taught quite lately as to the effect and value of depletion in relieving the over-distended right heart, produced by an obstacle to the pulmonic circulation.

There is no occasion for repeating here what has been said, under the head of pneumonia, in regard to tartar emetic. But if the temperature be very high, and the pulse full and strong, we believe that the small doses of sulphurated antimony (gr. $\frac{1}{12}$) we then recommended, in combination with Dover's powder, every two or three hours, are very useful in moderating the inflammatory symptoms. Should this be followed by nausea or vomiting with exhaustion, they must be suspended at once. The physician, and especially the young and inexperienced, ought to know that the susceptibility to the action of all antimonials is singularly different in different individuals. We have seen a hearty adult woman thrown into a most violent, and for a time alarming choleraic condition, by two doses of $\frac{1}{12}$th of a grain of tartar emetic each. We saw once a fine hearty boy five years of age, vomit violently, grow pale, weak, and faint away, from two teaspoonfuls of the mel. scillæ compositum, containing in the two doses the fourth of a grain of tartar emetic. And even twelfths of a grain of the sulphurated antimony will sometimes cause a degree of nausea and prostration in young children which ought not to be kept up, though we never saw it occasion such effects as those just mentioned as following the use of tartar emetic. When, therefore, the sulphurated antimony acts with any undue violence, it ought to be stopped, and we should substitute the citrate of potash mixture proposed for the mild form of bronchitis.

In connection with one of these internal remedies, counter-irritation to the surface of the chest will be found of very great service. Indeed, we doubt very much whether it is not the most important part of the treatment. It may be obtained by applications of dry cups to the back of the chest, or if this be inconvenient or objected to for any cause, by the use of mustard poultices. The poultice ought to be about the size of the hand, or one-half larger, and it should be made of one part mustard to two of Indian meal or flour. It is to be mixed with warm water, covered with book muslin or cambric, and applied first to the dorsum of the chest; after having reddened at that point, it should be shifted to the front of the thorax. The time necessary for each contact is usually from ten to fifteen or twenty minutes. These applications ought to be renewed once in four hours, when the symptoms are only severe, but when these are urgent, they should be made every two hours. We are in the habit of depending very much, also, on mustard foot-baths. When the oppression is severe, and especially where there is any coolness of the extremities, the use of a foot-bath simultaneously with the mustard poultice, will often assist very much in relieving the breathing.

In very young infants, antimony ought not to be employed, in my opinion, and in these, therefore, we need some other remedy. In them ipecacuanha is much safer than antimony, and it is quite active enough. The best preparation is the syrup, of which from three to five drops may be given every two hours to infants six months old. In older children, also, in whom we have been obliged to suspend the antimony, and in those in whom its use has been contraindicated by delicacy of constitution or by feeble health, the ipecacuanha is preferable. The doses must vary with the age. At five years, about ten drops every two hours, in combination with the same quantity of spirit of nitrous ether, is a proper dose. When the child presents a pale surface and a languid expression, and particularly when the skin is very slightly warmer than usual, or coolish, the following prescription has proved a most useful one in our hands:

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|---|---|
| ℞.—Liq. Ammon. Acetat., . . . . | f℥ss. |
| Syrup. Ipecac., . . . . . . | fʒj. |
| Liq. Morph. Sulphat., . . . . . | gtt. xl. |
| Syrup. Acaciæ, . . . . . . | f℥j. |
| Aquæ, . . . . . . . . | f℥jss.—M. |

Ft. mistura.

The dose of this is a teaspoonful for a child two years old, to be repeated every two hours. Should there be any nausea present, the syrup of ipecacuanha ought to be reduced to half the quantity; and if there be any drowsiness, the morphia must be left out.

In very severe cases of the disease, in which the dyspnœa is excessive, the pulse rapid and small, the skin cool and pale, the jactitation very great, and when there is present extensive mucous and subcrepitant râle, the treatment generally recommended is the frequent employment of emetics, and the French authors usually prefer tartar emetic. For our own part, we would not venture to administer, under such circumstances, so powerful a remedy, and especially so potent a sedative, as antimony, one that we have so often known to cause alarming and dangerous prostration in children laboring under much slighter disorders than suffocative bronchitis. If any emetic be given, it ought to be one of milder action and less perturbing influence than tartar emetic, and we should choose, therefore, either ipecacuanha or alum. The plan of treatment we prefer, however, is to make assiduous use of counter-irritants, and to give internally the spirits of Mindererus and a weak decoction of seneka. Depletion is, in these cases, either entirely contraindicated, or it should be resorted to only by the application of two or three small scarified cups. In a very severe case of this kind, the dangerous symptoms subsided under the use of cupping, mustard poultices and foot-baths frequently renewed, and the internal use of decoction of seneka and spiritus Mindereri every hour. Six small cups, of which only two were scarified, were applied once over the back of the thorax. In another case, which occurred in a child eighteen months old, during an attack of measles, the symptoms yielded and the eruption made its appearance, under the use of mustard foot-baths and poultices applied every two hours, and the internal use of spiritus Mindereri and spirit of nitrous ether. In both cases the symptoms of exhaustion were so strongly marked, that we feared to employ emetics, lest they might fatally increase the already dangerous prostration, though the dyspnœa and abundant mucous and subcrepitant râles seemed to call for them.

In the bronchitis of children, it often becomes proper and necessary to make use of *stimulants*. In the suffocative form, when the symptoms assume the character described in the last paragraph, small doses of brandy or wine-whey may be administered alternately with the spirits of Mindererus, with great advantage. In milder cases, also, when a sudden increase of the dyspnœa occurs, especially in feeble and debilitated subjects, and when we may suppose, from the character of the rational and physical signs, that collapse of portions of the lung has taken place, it is best to abandon for the time all nauseating remedies, and to make use simply of brandy in doses of from five to twenty drops every half hour or hour, or of wine-whey in dessert or tablespoonful doses, and of counter-irritants, with very light fluid nourishment.

In cases where there is such marked debility, tonics are very useful, and good results may be obtained from the administration of quinia, which was strongly recommended a few years ago, in the form of capillary bronchitis occurring in tropical climates, by Dr. Cameron (*London Lancet*, November 9th, 1861).

In cases of this kind, we have used with great advantage of late years small doses of quinia, prepared as follows:

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| ℞.—Quiniæ Sulphat., | gr. vj. |
| Acid. Sulph. Dil., | gtt. xij. |
| Syrup. Simp., | f℥ss. |
| Aquæ, | f℥ijss.—M. |

Give a teaspoonful every two hours, to children two or three years old.

In older children the proportion of quinia to the dose ought to be doubled. If this should sicken, as it will sometimes do by the disgust its bitterness produces, and the consequent resistance to the doses, it is best to lay it aside after two or three trials, and substitute the following:

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|---|---|
| ℞.—Elix. Cinchon. Flav., | fʒij. |
| Curacoa, | fʒij. |
| Acid Sulph. Dil., | ♏xij. |
| Aquæ, | f℥ijss.—M. |

Dose, a teaspoonful every two hours.

The child ought to be laid on an inclined plane of pillows, and, with the exception of turning it gently towards one side or the other, from time to time, it should be kept perfectly quiet. These directions are particularly important in very young children, as it is in them that debility and exhaustion of the muscular forces are apt to bring about the state of collapse just referred to.

As an example of the kind of case in which stimulants are useful, and to show also the dangerous effects which antimony sometimes produces, we will quote the following: A girl between seven and eight years old, was attacked while in good health with severe bronchitis. On the second day, when we were called, she was very much oppressed, the skin was hot and dry, the pulse rapid, and the surface pale. We ordered a cupping to the amount of four ounces, with some dry cups besides, over the back, and two drops of antimonial wine with ten drops of sweet spirits of nitre to be given every two hours. On the third day a blister was applied over the sternum. On the fourth day we found the child in the afternoon very pale, dozing or tossing about on the bed, and sometimes rising up on her hands and knees with a bewildered look; she was inattentive, so that it was almost impossible to catch her eye; the eyes were sunken, and the countenance was distressed and anxious; she moaned constantly and looked very ill; the skin was still hot; there was neither vomiting nor purging. The respiration was very much oppressed, and she coughed a good deal, though not so much as before. We suspended the antimony at once, and gave a teaspoonful of brandy in water, directing it to be repeated in three-quarters of an hour; after the second dose a teaspoonful was to be given in a wineglassful of milk and water every two hours throughout the night. On the following morning, the child looked better; she was less pale, and the eyes were not so excavated. The breathing was better. She was still very drowsy, but often waked partially with screaming and affright, and when awake took very little notice. The milk and brandy were continued every two hours. On the afternoon of this day, all the unpleasant symptoms had disappeared; there remained only those indicative of a slight bronchitis, and she was soon quite well. Now it seems to us exceedingly clear that, had the antimony been continued in this case, on account of the hot, dry skin, oppressed breathing, frequent cough, and from the absence of vomiting or purging, the child would have died.

The most important points in the treatment of *chronic cases*, are to insist upon a rigorous and persevering regulation of the hygienic conditions of the patient, and to make use of tonic, balsamic, and expectorant remedies. The child should be carefully and warmly clothed, and, when at home, kept in dry, well-ventilated, and, if possible, airy rooms, at a uniform temperature. The living room of such a child ought to be heated in winter by a wood-stove, or open wood-fire, if that is sufficient to keep up a proper temperature. .In our cold winters we have found no plan so good as a well-managed wood-stove. Coal fires cannot be lowered or extinguished at night, as they ought to be, and often keep up, through the day, too high a temperature. They are unmanageable.

These, indeed, constitute the truly important part of the treatment, for without them, there is but little chance that drugs of any or of all kinds, diet, or any other measures, will be of any real service. The dress and temperature ought to be the first things attended to, and after them, and as a secondary matter, certain medical substances will assist in removing the disease. The child ought to be taken as often as possible into the air in fine weather, and only in fine weather. The diet should be selected with a strict view to the improvement of the strength and vigor of the constitution; the food may consist, if the child be of proper age, of light meats, of potatoes and rice, as the only vegetables, and unless there is some contraindicating circumstance, of a small quantity of wine with the midday meal. The best wine is port, of which one or two tablespoonfuls may be given in a considerable quantity of water.

Tonics must be administered throughout the course of the disease, or until the appetite and strength shall have improved to such an extent as to make them no longer necessary. The best are quinine, in the dose of a grain morning and evening, to be continued for several weeks; or, when the child is thin and anæmic, small doses of arsenic with iron, as recommended in the article on eczema, and cod-liver oil, in doses of half a teaspoonful to a teaspoonful, three times a day after meals, either pure or in some carefully-made emulsion, will often greatly assist in curing these chronic forms of catarrh.

In one case of chronic bronchitis, which came under our care, the patient recovered under careful regulation of the hygiene, and the use of a decoction of seneka, prepared by boiling a drachm, each, of seneka and liquorice roots, in a pint of water, to half a pint. The decoction was strained, and a large teaspoonful given three times a day. The remedy was continued during a period of two months; under its use the child grew fat and strong, and recovered entirely from the disease.

Other remedies, proposed by different authors, are the various resinous preparations, the balsams of tolu and copaiba, benzoin, and the sulphurous mineral waters. In cases of long-standing, where mucous râles persist throughout the lower part of the lungs, showing an abundant morbid secretion, tannic acid has been found, by several good authorities, of much service. While these means are employed, it is recommended, also, to make use of counter-irritants. If any are used, they ought to be such as will not produce too much inflammation of the skin; as, for instance, weak Burgundy pitch plasters, daily frictions with hartshorn and sweet oil, a simple diachylon plaster, or very mild pustulation with croton oil.

## ARTICLE IV.

### PLEURISY.

Definition; Frequency; Forms.—Pleurisy consists in inflammation of the pleural serous membrane.

Idiopathic pleurisy is a rare disease under five years of age, and especially in the first and second years of life. After the age of five years it becomes more frequent. We have met with 28 cases of pleurisy, of which we have kept notes. Of the 28, 26 were idiopathic, and 2 secondary; one of the latter occurring during hooping-cough, and the other being accompanied by pneumonia, though the pleurisy was the predominant disease. Secondary pleurisy, on the contrary, or that which occurs in the course of other diseases, is common at all ages. M. Bouchut met with it in 23 out of 68 autopsies of new-born and suckling children. Of the 23, 9 accompanied acute pneumonia, 6 tubercular pneumonia, 5 entero-colitis, and 3 different other diseases. This form of the affection is rarely detected during life, being masked by the concomitant malady.

We shall describe two forms of the disease, the *acute* and *chronic*.

Predisposing Causes.—As to the influence of *age*, it has already been stated that idiopathic pleurisy is rare between birth and five years of age. It is certainly rare, during those years, in comparison with pneumonia, and especially with bronchitis, for we find that while we have met with but 15 cases of pleurisy of all kinds under five years of age, we have seen 28 of pneumonia under that age, and 105 of bronchitis under 6 years of age. Of 28 cases of pleurisy that we have seen, 26 were idiopathic, and of these one occurred at the age of three months; three between 1 and 2 years of age; one between 2 and 3; four between 3 and 4; eight between 4 and 5; three between 5 and 6; two between 6 and 7; three between 7 and 8; and one between 13 and 14. Of the two secondary cases, one occurred at six weeks of age, and one between 4 and 5 years. Secondary pleurisy is said, by the best authorities, to be most frequent between one and five years of age, being, in this respect, just the contrary of the idiopathic form of the disease.

Pleurisy is said to occur more frequently in boys than girls. Of 26 cases, in which we noted the sex, 19 occurred in boys and 7 in girls.

The idiopathic form is most apt to occur in vigorous and hearty subjects, while the chronic and cachectic forms attack those who are feeble and delicate. It is often, as already stated, a secondary affection, occurring particularly during pneumonia, and, after that disease, during rheumatism, scarlet fever, and Bright's disease. *Season* is another predisposing cause. It is most common during winter and spring, especially the latter.

The *exciting causes* are very obscure in most cases. The only ones which seem to have been ascertained with any certainty, are exposure to cold and sudden changes of weather. It has been said to follow external violence. In one of the cases that came under our own observation, the child had struck the affected side severely against a pointed stick on the day of the attack.

ANATOMICAL LESIONS.—The serous membrane may retain its natural characters, which happens in the majority of cases, or it may present the different appearances indicative of inflammation. These are more or less minute and abundant injection and punctuation, and spots or patches of an ecchymotic appearance, observable particularly at the points where the formation of false membrane has taken place. Another change produced in the pleura by inflammation is the loss of its natural polish, which is replaced by a more or less granular and rough appearance. In chronic cases it becomes whitish or opaline in color, and thickened. It is very rarely softened.

In addition to the lesions of the pleura itself there are various diseased products of secretion which require notice. These may be either solid or liquid. The solid products are the false membranes which exist so generally in all serous inflammations. They are found both upon the costal and pulmonic pleura. In their recent state they are of variable size and thickness, being in some cases very soft and deposited in small points; in others, more extensive, but thin, like paper; and in others again thicker (one or two lines in thickness), firmer, and decomposable into several layers. The outer layers are yellow, elastic, and soft, while the inner ones are red, more resisting, and marked with vascular arborization. When examined some time after their formation, the false membranes are found to have been converted into cellular adhesions, which may be either very loose, or they may fasten the lung tightly to the costal pleura. The adhesions are generally, however, thin, transparent, and in the form of loose bridles. After a length of time, the false membranes come to present the appearances of true serous tissue, and like that, are susceptible of inflammation.

The fluid found in the pleural cavity usually consists of transparent or turbid serum, holding albuminous flocculi in suspension. Sometimes, but more rarely, it consists of purulent serum, and still more rarely of pure pus. The liquid generally occupies the lowest portion of the thoracic cavity, but is sometimes circumscribed at various heights, or between the lobes of the lung, by abnormal adhesions, or by some part of the lung which has been rendered incompressible by inflammation.

The lung presents various alterations from its healthy condition. It is pressed backwards towards its root to a greater or less extent. The tissue of the organ is generally found in one of two conditions: either hard, not crepitating, impenetrable to the finger, and presenting a smooth surface when cut into, a state of things which has been expressed by the term *carnification*, and which is a mechanical effect of pressure; or else the lower lobe, which is in contact with the fluid, is large, heavy, fleshy, rather hard, not so easily penetrable by the finger as in simple hepatization, yielding under pressure only a small quantity of blood, and but slightly retracted towards the spinal column. The latter condition depends in all probability on an effusion which has occurred after, or coincidentally with, hepatization.

In some cases, in which the effusion is but small, or where it has been absorbed, the lung is found to be elastic and crepitating. Whatever the amount of effusion may be, it is said that the lung can always expand to its normal size if the fluid be absorbed, unless it has been too firmly bound down by false adhesions.

Pleurisy, whether complicated with pulmonic disease or not, is much the most frequently confined to one side. In idiopathic cases, it is more common on the right than left side; when it accompanies pneumonia, it is, on the contrary, more common on the left than right.

SYMPTOMS.—In describing the symptoms, we shall treat first of the physical, and then of the rational signs, and of the course of the disease.

The *physical signs* are exceedingly important, as they often constitute, especially in young children, the only means of recognizing the disease. The *pleural friction-sound* is less important than some other physical signs, as it is scarcely ever heard in children under five years of age, and only during the absorption of the fluid, as a general rule, in those above that age. *Bronchial respiration* may commonly be detected from an early period in the attack. At first it is heard during inspiration, but afterwards it exists both during inspiration and expiration, or in the former alone. In a majority of the cases it is heard over the posterior portion of the thorax, and upon one side only. At first it is audible over nearly the whole height of the affected side, while later in the disease, it can be perceived only at the inferior angle of the scapula or in the interscapular space. Its duration is variable; it may disappear in a few days, or last for a much longer time. In favorable cases it is usually replaced by feeble vesicular respiration, more rarely by friction-sound, and sometimes by pure respiration. This sign is almost always present at all ages in acute cases, but is often absent in those which are slow and tedious. In suckling children it is not constant, but intermits occasionally, so that it may be heard at one and not at the next examination. *Ægophony* can rarely be detected in children less than two years old. Under that age, there is heard instead of it resonance of the cry, especially in the region beneath and on a line with the spine of the scapula. It is intermitting like the bronchial respiration. In children over two years old, ægophony can often be distinguished by careful examination, but never, of course, unless the quantity of effusion is considerable. It is heard at an early period of the attack, and chiefly in acute cases, and must be sought for in the lower portion of the interscapular space, and the inferior dorsal region. It coexists almost invariably with bronchial respiration, lasts but a short time, disappearing after one, two, three, or four days, and it is intermitting. In older children, it is sometimes replaced by diffused resonance of the voice, as it is by resonance of the cry in infants. In a case that occurred to one of ourselves, in a girl between six and seven years old, and in which the disease became chronic, the voice was not purely ægophonic, but reedy and quavering, from the fifth to the tenth day. After that date the effusion became so great that all sound was suppressed.

*Feebleness or absence of the respiratory murmur* seldom exists at the beginning of acute cases, but in the subacute or chronic form is generally present from the invasion. In the latter class of cases feeble respiration is noticed first over the inferior portion of the dorsal region, but, as the effusion increases, it is heard also in the upper and anterior regions, and becomes more and more feeble, until at length no sound whatever is audible; the respiratory murmur is suppressed. In acute cases, on the contrary, the absence of the respiratory sound is observed at variable periods of the attack; when noticed soon after the invasion, it is generally coincident with bronchial respiration, which, heard at first over the whole or the inferior three-fourths of the dorsal region, becomes afterwards perceptible only in the interscapular space, or at the inferior angle of the scapula, while the respiration is feeble or absent over the lower portions of the lung. In acute cases the feeble respiration remains limited to the dorsal region, and disappears after a few days,—in from five to eight, according to our experience; while in chronic cases it extends over a larger surface, and continues for several weeks, or even months.

*Percussion.*—This means of diagnosis is very important in all cases of the disease accompanied by effusion of liquid, unless the quantity be exceedingly small. When, on the contrary, the inflammation results merely in the production of thin false membranes, percussion furnishes no useful information.

Percussion is of no assistance, however, at the moment of invasion, as it is not until the period at which effusion takes place that the resonance of the thorax begins to be altered. In acute cases, the resonance is generally duller than natural, though seldom entirely dull, on the second, third, or fourth day. As the effusion augments, the dulness increases over the region occupied by the fluid, until at length all resonance ceases, and the sound is perfectly flat. The degree of dulness can be properly appreciated only by comparing the two sides together. The degree, extent, and duration of this sign will depend, of course, upon that of the effusion. In children, as in adults, the sounds afforded by percussion vary with the position of the patient, which influences, of course, the situation of the fluid in the pleural cavity.

In regard to the physical signs of pleuro-pneumonia, it may be stated that when a pleuritic effusion takes place in a child laboring under pneumonia, it happens, as a general rule, that the bronchial respiration occasioned by the inflammation of the lung increases in intensity, though in some few cases it is diminished or suppressed. MM. Rilliet and Barthez lay down the following principle: "That *when a pleuritic effusion occurs* *in a child affected with hepatization of the inferior portion of the lung, all the abnormal sounds which were perceptible over the diseased point are considerably exaggerated, and the sonority disappears.*"

*Inspection* of the thorax affords no assistance at the invasion of the disease, nor generally in acute cases which last but a short time, and in which the amount of effusion is small. When, however, the effusion is large, it may be observed, upon close examination, that the movements of the affected side during respiration are more limited than those of the opposite one, and that the intercostal spaces are more projecting than natural, in consequence of distension by the fluid within. At the same time *mensuration* will show that the side on which the effusion exists is larger than the other. The difference may amount to one-third or two-thirds of an inch. In acute cases, in which the quantity of liquid is small, mensuration will of course show no difference.

*Palpation* is an important means of diagnosis, especially in making the distinction between pneumonia and pleurisy. In the former disease, the vibration of the thoracic walls during either crying or speaking, is augmented; whilst in the latter it is diminished, or when the effusion is considerable, ceases altogether. This sign is important, both in infants and older children.

RATIONAL SYMPTOMS; COURSE; DURATION.—Acute pleurisy is rarely met with, as already stated, in children under six years of age, except as a secondary affection. In idiopathic cases it begins with severe pain in the side, cough, some difficulty of respiration, increased frequency of the pulse, loss of appetite, thirst, bilious vomiting, sometimes headache, and in rare instances delirium. The *pain* in the side or *stitch* is almost always present in acute cases occurring in healthy children, while in those which are slight, or which occur in weak and debilitated subjects, or very young children, it very often cannot be detected. Sometimes, however, its existence may be ascertained in very young children by tenderness of the side shown during the act of percussion. When present in young children, it can always be detected by watching the face of the child and observing its gestures during the act of coughing, and during full inspirations, as in those made in crying, after sudden movement, or in the act of gaping. In an infant of thirteen months old, who was attacked with pleurisy of the right side, causing effusion of thick yellow pus into the right pleural sac, and which ended fatally in a month, only the blindest observer could fail to see that every act of coughing was acutely painful, for the child uttered each time a short, sudden cry, which was hushed as soon as given, while at the same moment there passed across the face an expression, amounting almost to a grimace, of suffering, which was unmistakable. The pain is aggravated by coughing, by full inspirations, by change of position, and by percussion. The seat of pain is almost always in front, but it may extend irregularly over the whole of one side to the arm, or it may be confined to the false ribs, or less frequently to the neighborhood of the nipple; it generally lasts from three to six days, though it sometimes continues longer. This symptom was complained of in most of the cases that we have seen. In some it was very acute and severe for one or two days, while in others it was slight, not well defined, and very transitory. In one, the child said there was no pain, but a sensation of weakness in the side when she coughed. In another, the pain was severe for a few hours, but was relieved by a sinapism, and was not felt again, though the attack resulted in a very large effusion into the side. In a third it lasted a week, and in a fourth only two days, though in both the effusion was extensive, and required several weeks for its absorption. In a fifth case it continued for five days. In the last, the effusion was very slight. It was aggravated in all these cases by coughing, by the act of respiration, especially when this was deep, and by motion.

*Cough* exists in nearly all idiopathic cases, and generally from the onset, though sometimes not before the second or third day. Usually frequent and dry, it commonly retains these characters in acute cases, for four or six days, and then diminishes rapidly. In more tedious cases it continues for a longer time, but moderates in violence after some days. In secondary cases it has no special characters. It was present in all but one of the cases seen by ourselves. Its character varied very much. In some it was frequent, teasing, and very painful. In others it was rare, scarcely troublesome, and only slightly painful. In all it was very dry, this constituting one of its most marked features, and giving it a very different character from the cough of bronchitis, and also, though somewhat less distinctively, from that of pneumonia. It continued almost entirely dry throughout the disease, except in a case which became complicated after a time with slight bronchial inflammation, and, in that, it became loose. There is generally no *expectoration;* if any, it consists of a small amount of whitish, frothy, sero-mucous fluid.

The *respiration* is usually accelerated in acute cases, but remains natural in other respects; the dyspnœa, however, is slight, as a general rule, compared with that of pneumonia. The difficulty of breathing is commonly in proportion to the earliness of the age, and to the extent and rapidity with which the effusion takes place. In the acute cases that came under our own observation, the breathing was usually about 36, 38, 40, and 48, but in one case it rose to 68 for a single day. It was not labored, and appeared to be difficult only from the fact of its being more or less painful. In a case of double pleurisy that came under our observation, it was most laborious, and dreadfully painful, as was also the cough. In the cases attended with but slight pain, there was no dyspnœa. It usually subsided after two or three days, when large effusion took place, converting the case into the chronic form.

The *fever* is not usually very great, and seldom lasts more than a few days, or a week. In some few cases, however, that we have seen, the febrile reaction has been very high. In one, in a child between three and four years old, the pulse rose to 172 on the first day, though the respiration was but 36; the skin was very hot and dry, and there was very great drowsiness and inattention. In other cases the pulse was 140, 128, and 124. The acceleration of the pulse usually lasts three or four days, after which it falls, so that by the end of a week it is seldom over 70, 80, or 90. The *heat* of skin is not very great in most instances, and generally subsides rapidly, and disappears after a few days. In acute secondary attacks, the febrile symptoms are more marked as a general rule, than as has just been described, because of the existence of the concurrent disease.

The *countenance* presents no particular characters, except that an expression of pain passes across it occasionally when the child coughs, or takes a deep breath. It is seldom deeply flushed as in pneumonia. The alæ nasi are dilated only during the continuance of the difficulty of respiration.

The *decubitus* is generally dorsal or indifferent. In two cases observed by us, in which the effusion was large, the number of inspirations was always from three to five greater when the child laid on the *sound*, than when on the affected side.

*Headache* is often present during the first few days, in children over six years of age, and is sometimes very severe.

*Convulsions* are said to occur sometimes at the onset in very young children. The *strength* is not usually much diminished, except during the acute period. The *appetite* is diminished and the *thirst* acute, but neither of these symptoms is so marked as in pneumonia. The *tongue* is usually moist, and sometimes covered with a coat of whitish fur; the *abdomen* is natural.

*Bilious vomiting* is said to occur in more than half the cases. The *stools* are generally regular, or there is some constipation.

*Auscultation* practised soon after the invasion generally reveals rude or bronchial respiration without any rhonchus. The percussion is dull. The cough, pain, fever, and difficulty of breathing continue for several days, after which all but the cough generally disappear, while that commonly persists in a mild form. In acute cases, the appetite now begins to return, the thirst moderates, and auscultation reveals only feebleness of the respiratory murmur and slight dulness on percussion. The general symptoms cease soon after this, and the patient is entirely convalescent in from one to three weeks, though feeble respiration and diminished sonority sometimes persist for a longer period.

*Urine.*—The urine in pleurisy has the so-called febrile characters, but usually not in any degree approaching to the urine in pneumonia, the water being less diminished, and the urea less increased. In cases where there is rapid effusion into the pleura, the chlorides are lessened or almost wanting; and reappear as the effusion is absorbed. Albumen is scarcely ever present.

*Chronic pleurisy* may follow the acute form, or occur as an idiopathic disease. In the former case, the acute symptoms diminish after a variable length of time, but the fever does not cease entirely and often recurs towards evening. In the latter case there is usually a very moderate degree of fever at first, which soon subsides and then disappears, or there is none at all; the pain is generally, though not always, vague, uncertain, and attracts but little notice. In one case that we attended, the cough was frequent, rather dry, and very painful for the first few days, after which it became looser and ceased entirely, though the inferior two-thirds of the right side were filled with effusion for a period of two weeks afterwards. In a second, in which the whole of the left side was occupied by the effusion, there was no cough whatever. In a third, there was a very slight, infrequent cough during the first day, but after that, though the effusion occupied the right side up to the spine of the scapula, there was none through the day, and merely a little hacking at night. In a fourth, in a girl, between four and five years old, there was considerable fever during the first week, but literally no local symptoms whatever, so that the case was mistaken for one of bilious fever by another physician. When it came under our notice, some obscurity in the symptoms led us to examine the chest, where we found an effusion occupying the lower third of the right side. The fever was now diminishing, and soon disappeared, but the effusion increased, without pain, and with only an occasional cough, until it filled up three-fourths of the side. It then stopped, and after several days, began to recede. At the end of about six weeks, the child was quite well again, and continues so to this time, about three years. In a fifth case, in a boy, between five and six years old, the attack was extremely obscure. There was very slight fever, almost no cough, indeed none except upon some exertion being made, and then scarcely noticeable, and no severe pain whatever. In fact, the child complained of no pain whatever, but upon being asked, referred to an uneasy sensation in the inferior lateral region of one side. The tongue was coated, and the symptoms were rather those of some bilious derangement, than of anything more serious. It was not until after four or five days of attendance, that a careful examination of the chest showed the existence of a slight effusion in the right side. This gradually increased until it reached nearly up to the clavicle, and then slowly disappeared again. The respiration is somewhat accelerated in all cases, and when the effusion is very large, and especially when it is purulent and attended with violent hectic fever, it is sometimes excessively labored and difficult. In the cases that we have seen, however, even when the effusion has been very large, the breathing has not been difficult. In one case it was between 40 and 50 during the first two days, after which it fell, as the effusion took place, to 30. In a second it was 45 at first; at the end of a week it was 38; at the end of the third week, as the effusion was being absorbed, it had fallen to 28, soon after which the recovery was completed. In a third it was so slightly disturbed that we did not at first suspect any disease of the chest. On the fourteenth day, the effusion reaching then nearly to the spine of the scapula, the breathing varied between 40 and 28 during sleep, but during the waking state there was no visible oppression.

The effusion takes place gradually, and is generally large. The percussion is now entirely dull over a greater or less extent of the side, and the respiratory sound is suppressed. The side is evidently enlarged, the increase of size being visible to the eye and ascertainable by measurement. If the effusion be purulent, constituting empyema, and the case is to end unfavorably, the child emaciates, grows pale, has night-sweats and hectic fever, and dies at last in a state of profound exhaustion. In favorable cases, on the contrary, and nearly all those in which the effusion is sero-albuminous belong to this class, the effusion is gradually absorbed, and the patient recovers with a contraction of the side. In some instances the fluid has been evacuated by an opening through the parietes of the thorax, caused by ulceration or made by a surgical operation; and in others again by an opening into the lung, through which the fluid has been expectorated. In one case that came under our own observation, in which the effusion was purulent, a natural cure took place by the evacuation of the fluid through an opening in the walls of the chest. This case occurred in a very hearty boy, of between four and five years of age. He was taken sick in the country, with what was supposed to be an attack of typhoid fever. After many weeks of violent illness, an abscess showed itself in the neighborhood of the left nipple. This, at the end of two months, discharged, and the patient began to improve. At the end of three months, he was brought to town, and we saw him. We found a fistulous orifice, discharging occasionally considerable quantities of pus, just below and inside of the left nipple. The left side was very much contracted, and the lung was retracted into the upper part of the chest. He was put on cod-liver oil, wine, and nutritious food, and gradually improved. He was soon removed to the country, and we did not see him again, but have since heard that he had entirely regained his health. The recovery by absorption has been known to take place two and five months after the invasion. In one case that we saw, the duration from the time when the effusion took place to its complete absorption was five weeks; in a second it was between six and seven weeks; in a third, six weeks; in a fourth, seven; and in a fifth, two months.

DIAGNOSIS.—Pleurisy may be confounded with pneumonia or hydrothorax. From the latter affection it is to be distinguished by the absence of pain in that disease, by the existence of the effusion on both sides of the thorax in most cases, and by the fact that hydrothorax generally follows as a consequence of some previous disease, particularly the eruptive fevers or nephritis.

The distinction between acute pleurisy and lobar pneumonia is more difficult than that between pleurisy and hydrothorax, and in some instances is subject to considerable doubt. It may generally be arrived at, however, by attention to the differences laid down in the following table, which is taken from the Bibliothèque du Médecin Practicien.

| ACUTE IDIOPATHIC PLEURISY. | ACUTE IDIOPATHIC PNEUMONIA. |
|---|---|
| Frequent after six years of age; rare under that age. | Frequent after six years of age; more rare under that age, but much less so than pleurisy. |
| Begins with dry cough, sharp thoracic pain, bronchial and metallic respiration during inspiration, either on the first day or later, and more rarely with obscurity of the respiratory sound. | Begins with cough, slight thoracic pain, and crepitant or subcrepitant rhonchus; at a later period there is bronchial respiration during the expiration and bronchophony. |
| Modification of the physical signs by change of position. | No modification under like circumstances. |

| ACUTE IDIOPATHIC PLEURISY. | ACUTE IDIOPATHIC PNEUMONIA. |
|---|---|
| Fever and acceleration of the respiration usually moderate. Rapid diminution of these symptoms from the fourth to the seventh day. | Fever violent; considerable acceleration of the respiration. Diminution of these symptoms less marked, less rapid, and not before the sixth or ninth day. |
| Expectoration absent or very slight. | Expectoration mucous; sometimes sanguineous; very rarely rust-colored. |
| No rhonchi. | Rhonchi preceding, following, and often accompanying the bronchial respiration. |
| Absence of vibration of the thoracic parietes during speaking or crying. | Augmentation of vocal resonance very sensible in older children, and in a less degree in all. |
| Course of the disease irregular; rapid disappearance in some cases, prolonged duration in others. The bronchial respiration is substituted or masked by feeble respiration. | Course of the disease regular; steadily increasing in most cases, and then diminishing from the sixth or ninth day. Bronchial respiration more disseminated. |

In some cases, especially in young children, where the onset of pleurisy is very sudden and acute, the general febrile disturbance may entirely mask the local symptoms, and lead to the belief that some one of the exanthemata is about to develop itself.

Thus we have met with cases where, in the midst of full health, the child has been seized with violent fever; extreme restlessness alternating with stupor; repeated vomiting; great frequency of pulse; acceleration of respiration; but with little or no cough and no complaint of pain in the side. In one instance of this kind, the heat of skin, rapidity of pulse, and frequency of the vomiting were so marked that for twenty-four hours we suspected the approach of scarlet fever, and not until the second day were we able to satisfy ourselves of the nature of the attack by observing that the act of respiration was evidently painful, and by detecting the physical signs of plastic pleurisy over the right apex posteriorly.

In 2 cases, one at the age of 3 months, the other at 1½ years, we have observed most excessive and almost tetaniform reflex irritability, so that the slightest movement of the child's body, or the attempt to examine the chest, would provoke violent startings and spasmodic contractions of the entire body. In both of these cases a fatal result followed, and post-mortem examination revealed the presence of localized empyema.

The chronic form of pleurisy with extensive effusion, may be easily distinguished by the history of the case, by inspection, palpation, and mensuration of the chest, by the nearly total absence of sonority and of the respiratory murmur except at the inner edge of the scapula, and by attention to the character of the general symptoms.

PROGNOSIS.—Acute pleurisy is rarely a fatal disease in healthy subjects. When it occurs as a complication of some other malady, on the contrary, it is much more apt to terminate unfavorably. The degree of fatality in secondary cases will depend, of course, in great measure, on that of the primary disease. Pleuro-pneumonia is a more dangerous disorder than either alone. Of 5 cases of primary pleuro-pneumonia, observed by Rilliet and Barthez, 2 died; while of 10 secondary cases, 8 died.

Of the 28 cases that we have seen, 5 died. The 5 fatal cases were all primary; 4 of them occurred in infants, 2 at 6 weeks, and the others at 13 and 18 months respectively, and the fifth was a case of double pleurisy in a boy between four and five years old. Of the 23 children that recovered, one was between 1 and 2 years of age; one between 2 and 3; three between 3 and 4; while eight were between 4 and 5 years of age, and the remainder over that age. In our experience, therefore, the mortality was, as might have been expected, much greater in those cases occurring at a very early age.

Chronic pleurisy is generally a serious, and not unfrequently, a fatal disease. Of 5 cases, observed by the authors, MM. Rilliet and Barthez, 2 proved fatal.

TREATMENT.—The *hygienic treatment* in this, as indeed in all the diseases of children, is of the utmost importance, and ought to be regulated by the practitioner himself. In all forms of the disease, the child should be carefully protected from cold, and in the acute form, kept at rest, and if possible, in bed. The diet must be very strict, and should consist for a few days of the preparations of milk. After the fever has disappeared, bread and milk, vegetable soup with a few oysters boiled in it to make it agreeable, and gradually rice, potatoes, and at last small quantities of meat, may be allowed. In the chronic form the diet ought to be nutritious, but regulated with equal care, as to quantity and material. In that form the patient should be taken into the air if the weather be mild and dry, and in winter the chamber ought to be well aired from time to time.

*Bloodletting.*—Local depletion ought to be employed in the early stage of acute pleurisy, as a general rule. Blood may be drawn either by cups, or leeches, the quantity to be regulated by the age and constitution of the patient. From two to four ounces may be taken generally from a child between four and six years of age. It is seldom necessary to repeat the operation; when, however, the acute symptoms are not at all relieved by the first detraction, it would be proper and useful to resort again to a small leeching, or cupping, as recommended in the article on pneumonia.

Depletion in any form ought to be avoided in most of the secondary cases, unless the symptoms are very acute and the child strong and vigorous; also in all chronic cases, after the febrile symptoms have been dissipated, and in feeble, delicate children.

*Antimonials—Febrifuges—Opiates.*—A moderate use of the antimonials is of great service in the acute stage of the disease. Small doses of antimonial wine and sweet spirits of nitre, or fractional doses of sulphurated antimony, as recommended in the article on pneumonia, will generally cause the fever, dyspnœa, and cough to subside rapidly. Large doses are unnecessary in any case, and are liable to be injurious in all.

In cases in which antimonials ought not to be used, as where they are opposed by some idiosyncrasy, in children of low vital force, and in the secondary form, we have found a citrate of potash mixture, containing ipecacuanha and opium, and digitalis, when the heart is much excited, very useful. The quantity of opium must be proportioned to the pain. When this is severe, the doses must be full. The good effects of this remedy, in serous inflammations, are now generally acknowledged. At two years of age, one drop of laudanum in the above mixture, every two hours, or half a grain of Dover's powder, with the twelfth of a grain of sulphurated antimony, every two hours, until a decidedly tranquillizing effect is obtained, may be used. When positive drowsiness has been brought about, the doses ought to be given at longer intervals—every three or four hours.

*Mercury.*—In former years mercury was constantly employed in conjunction with bloodletting. In our last edition we opposed its use as unnecessary in acute cases, but stated that there was high authority for employing it in cases of the acute form tending towards the chronic, and in confirmed chronic cases; adding, however, that we had not found it necessary even in these. We find, now, that Dr. West, of London, still speaks highly of it. He says (*loc. cit.*, p. 303): "After depletion, our chief reliance is to be placed on calomel, which should be freely given in combination with opium or Dover's powder; and an attack of pleurisy thus treated, will often be cut off in thirty-six or forty-eight hours." Dr. J. Lewis Smith, of New York (*loc. cit.*, p. 279), does not even mention mercury in his remarks on treatment. Dr. Thomas Hillier (*Diseases of Children*, Amer. ed., 1869, p. 87) says: "Formerly I gave mercury to all cases of primary pleurisy, but this practice I have discontinued, except in the form of an aperient. Instead of it, salines, such as acetate of ammonia, nitrate of potash or soda, the citrate of potash, and nitrous ether, are given."

The experience we have had, since we last wrote, has not at all increased our faith in this remedy. We believe that as time goes on, and knowledge grows, there is good reason to think that the good effects formerly ascribed to calomel in such a variety of diseases, were due to the medicines given with it, and particularly the opium (without which it was not often used), the ipecacuanha, the salines, and even the antimonials.

The remedies employed by ourselves, after the disappearance of the acute symptoms, when the effusion has taken place, and especially if there seems any tendency for the case to pass into the chronic form, are either iodide of potassium in syrup of sarsaparilla, according to the following formula:

℞.—Potass. Iodidi, . . . . . . . gr. xvj.
Syrup. Sarsap. Comp.,
Aquæ, āā, . . . . . . . . f℥j.—M.
Dose, a teaspoonful three times a day;

or, the syrup of the iodide of iron, of which from thirty to sixty drops should be substituted for the iodide of potassium, in such a mixture as the above. The iodide of potassium is preferable in the early stage. After a time, and especially in anæmical and delicate patients, the iodide of iron should be substituted. Under this treatment, combined with the application of a Burgundy pitch plaster to the side, or some other form of counter-irritant, the effusion has usually disappeared in from two to eight weeks, though diuretics may have failed to make any impression on the cases.

*Diuretics* are highly recommended in the treatment of cases in which effusion has taken place. Those chiefly employed are squills, digitalis, and nitre. The squill is given alone, or in combination with digitalis, and by some with calomel, or with both. The dose of the powder of squill or digitalis, is about a quarter of a grain every two or three hours. The squill may be used also in the form of syrup or oxymel, and the digitalis in tincture. These two substances may be employed in the following formula:

| | |
|---|---|
| ℞.—Acet. Scillæ, . . . . . . . . | fʒij. |
| Tinct. Digitalis, . . . . . . . | gtt. xxx. |
| Aquæ Fluvial, . . . . . . . | f℥iv.—M. |

Of this a teaspoonful is to be given three or four times a day to children two years old. This formula was made use of for several days in two of the cases referred to, without any perceptible diminution in the amount of the effusion, whereupon it was suspended, and the iodide of potassium, and afterwards the iodide of iron, as above recommended, substituted, and with much better effect.

*Purgatives* ought to be used during the acute stage of pleurisy to an extent sufficient to keep the bowels soluble, and to act as mild evacuants. In chronic cases, on the contrary, they are particularly recommended as evacuants, in order to deplete the bloodvessels, and thus hasten the absorption of the effusion. So far as our experience goes, this treatment is unnecessary, as diuretics and alterative tonics are generally sufficient, without a resort to violent remedies, which must irritate the intestinal mucous membrane, always extremely susceptible in children, to a dangerous degree.

*External Remedies.*—Blisters are very generally employed, in the acute form, to relieve pain and dyspnœa, and, in the chronic, to hasten the absorption of the effused liquid. We did not apply them in the cases under our charge, having succeeded very well without; but would not hesitate to make use of a small one, applied for a not longer period than two hours, if the pain and oppression persisted. In chronic pleurisy, the application of a large Burgundy pitch plaster, made rather weaker than what is used for adults, and large enough to cover nearly the whole side, would be preferable to blisters.

*Tonics* are often necessary in chronic, and sometimes, after the febrile symptoms have subsided, in acute cases occurring in feeble and delicate children. The most suitable are quinine, in the dose of a grain morning and evening, small quantities of very fine port wine, and the preparations of iron.

*Paracentesis.*—Since the last edition of this work, the operation of paracentesis in cases of pleurisy, both acute and chronic, has been performed so frequently and with such encouraging results, that it may now be considered to occupy an assured position among the remedies for certain conditions of this disease. It appears desirable, therefore, to discuss somewhat in detail the circumstances in which it is applicable, the indications which call for it, and to a certain extent the mode of its performance. In doing this, we shall avail ourselves freely of the admirable and exhaustive discussion of this operation by the lamented Trousseau (*Clinique Médicale*, tom. i, pp. 619–698), to whose practice and teaching it is in great part due that paracentesis thoracis is so generally recognized as a justifiable operation for the relief of excessive pleuritic effusions.

In acute pleurisy he recommends the operation more frequently than most authorities consider necessary. Whenever, indeed, the effusion becomes so excessive as to almost entirely fill the pleural sac on the affected side, displacing the adjacent viscera seriously, whether the patient presents intense dyspnœa or not, he advises its performance. The reasons urged by him for this practice are that although ordinary cases of acute pleurisy almost invariably recover, yet when such excessive effusion exists, it may prove fatal in more than one way. It has not very rarely happened that, from the obstruction to respiration, conjoined with the embarrassment of the heart's action due to its twisting and dislocation, death has occurred suddenly, and we have met with the records of several cases in children which had this unfortunate and unexpected termination.

Again, in these cases of excessive serous effusion, if the fluid be not removed either by absorption or paracentesis, there is great danger that the case will be converted into one of empyema, not from the actual conversion of serum into pus, but from the altered condition of the secretion from the pleural surface.

But even when the fluid does not become thus converted into pus, but remains clear and serous, absorption is very slow, and the patient may perish from exhaustion and hectic fever. During the long time necessarily occupied in the absorption of the fluid also, the pleurisy really becomes less and less curable, since the lung contracts such close and dense adhesions as prevent it from ever fully expanding again. Finally, if any tuberculous diathesis exists, the long course of the pleuritic attack favors very greatly the development of phthisis.

The chief objections which have been urged against the performance of paracentesis in these acute cases are that the effusion will form again rapidly, requiring repeated punctures and exhausting the patient; that the operation prolongs the duration of the case; and that there is danger of converting the serous effusion into a purulent one.

In regard to the first of these, however, experience has shown that in many cases a single puncture is sufficient, and that even when the fluid does reaccumulate, it is scarcely ever to such an extent as to demand a repetition of the operation.

There is, again, no reason for supposing that the puncture, if properly performed, can in any way tend to prolong the case. In regard to the last objection, the cases recorded sufficiently show that if care be taken to prevent the admission of air, there is not much reason to apprehend the conversion of a serous into a purulent collection, unless the constitutional condition is so impaired that in all probability the case would have passed into one of extensive empyema, had the operation not been performed at all. Indeed, it is proved by the direct experiments of Nysten and Hewson, that air injected into the pleural cavity does not the least harm to the serous membrane.

In view of the various risks incurred in these cases of excessive serous hydrothorax, Trousseau thus sums up his remarks upon the operation: "Whenever auscultation and percussion reveal the presence of a very large effusion, whether its formation has been attended with acute symptoms or not, which interferes seriously with respiration, even though dyspnœa is not marked; and when this effusion tends to increase, despite the active employment of local and general remedies for nine or ten days, the operation is indicated." He especially directs attention to the fact that the mere amount of dyspnœa must not be taken as a guide, since this may be absent, although there are at the same time evidences of grave interference with the oxidation of the blood. If, however, during the existence of such an effusion, spells of suffocative dyspnœa should ensue, or syncopal attacks, the operation is urgently called for.

In the *London Hospital Reports* for 1865, these views are warmly advocated and powerfully supported by Dr. Fraser, who believes that the operation should be more generally employed than at present.

We have already alluded to the fact that occasionally an extensive effusion will remain serous for a long time, but in the majority of cases, and especially in children, it sooner or later becomes transformed into pus. Indeed, so frequently does this occur, that West expresses his conviction that in every case of idiopathic pleurisy in childhood, in which fluid is poured out in considerable quantity, the effusion is either originally purulent or becomes so very speedily. In these unfortunate cases, where there is little or no disposition to absorption, where marked hectic fever and exhausting night-sweats soon set in and rapidly debilitate the patient, and where the most favorable result that can be hoped for is that the pus will either evacuate itself externally, or open into the lung and be expectorated, the operation of paracentesis should be undoubtedly performed.

It is evident, indeed, that paracentesis must here have many advantages, since in cases where the pus discharges externally spontaneously, it is almost invariably about the fourth intercostal space, and outside of the nipple, at a point therefore which renders it unfavorable for the pus to freely evacuate itself, and which thus tends to keep open the fistula for a very long time. Again, it not rarely happens in these cases that the fistula does not lead directly into the pleural cavity, but the pus has burrowed in the thoracic walls, leading to ulceration and necrosis of the ribs or sternum.

The termination by the establishment of a pleuro-bronchial fistula, and the evacuation of the pus through the bronchial tubes, [illegible] favorable one, but yet the case is apt to be more tedious, and certainly the lung-tissue must be much more seriously affected than when a free exit is given to the matter by the operation of paracentesis. In these cases, of course, the effusion will almost certainly form again, and either require repeated punctures, or a fistula will be established, through which pus will discharge almost daily.

In addition to the advantage afforded by relieving the system of this source of irritation, and giving the lung a chance to expand, paracentesis enables us also to introduce medicated fluids into the thorax, and thus to modify the diseased surface. We will detail below the injections which appear to us most useful for this purpose.

Although, under the most favorable circumstances, empyema is a most dangerous and not rarely fatal affection, numbers of cases are on record in which life has been undoubtedly saved by a recourse to this operation, and it has been noticed that the proportion of success is much greater in cases of children than of adults. Thus, out of 46 cases in childhood, 13 of which occurred in West's practice, no less than 35 terminated favorably, there being 1 death in every 4 cases.

In a recent paper by M. Guinier, of Montpellier (*Bull. de l'Acad. de Méd.*, t. xxx, p. 645; *Bien. Retrospect of New Syd. Soc.*, 1865–6, p. 152), the particulars of 31 cases from different authors are recorded. The patients were of all ages up to 14 years; as many as 16, however, were in their 7th, 8th, or 9th year. In one of his own cases, a rapid recovery was effected in a case of extensive sero-purulent pleural effusion in a nursing child one year old. The mortality was about 1 in 6; and in no instance does the operation appear to have done any harm, but, on the other hand, seems to have relieved suffering and retarded death even in the fatal cases.

One reason of this greater success in early life possibly is, that the much greater mobility of the chest-walls in children allows a rapid contraction of the thorax to occur after the pus has been withdrawn, so that the chest-wall comes in contact with the lung, which, in such cases, is always bound down by dense and strong adhesions; whereas, in adults, the more unyielding character of the thorax maintains a space between the two layers of pleura for a much longer time.

The great deformity of the thorax which ensues upon empyema in childhood is rarely permanent, but as the lung slowly expands, the thoracic walls gradually regain their normal shape, the depression of the shoulder disappears, and in the course of a few years at the farthest, scarcely any trace of distortion or contraction remains.

In regard to the performance of the operation itself, the chief source of difficulty lies in the necessity of excluding air; though this precaution is only necessary in cases of serous effusion, since where paracentesis is performed for empyema it almost invariably happens that sooner or later the pleural sac communicates with the external air.

The procedure recommended by Trousseau is as follows: The patient being placed near the edge of the bed in a semi-recumbent posture, his body steadied by an assistant, a small incision is made through the skin in the sixth or seventh intercostal space, a little outside the line of the external border of the pectoralis major. An ordinary trocar, the canula of which is protected by a valve of goldbeater's skin, thin gutta-percha, or a piece of animal membrane of any kind, is then placed in this wound and thrust boldly into the pleural cavity, the precaution being taken of grasping the instrument so that not more than one inch shall be free, to avoid all possibility of wounding the lung.

It is necessary that the thrust given to the trocar should be fearless and quick, since if it be pushed in a hesitating way, the point may push before it the layers of false membrane which probably coat the pleura, and the effusion will not be reached. Should this accident occur, an attempt may be made to break through the false membrane by a probe introduced through the canula, or a second puncture must be made in a different place.

Different opinions exist in regard to the advisability of withdrawing the entire effusion at once, but experience has, we believe, shown that no unfortunate results need be apprehended from so doing. The last portions of fluid which escape are apt to be stained with blood, probably from rupture of the delicate new-formed vessels of the false adhesions.

The dressing of the wound should be as simple as possible, consisting merely of closing the incision by a piece of adhesive plaster, over which a pledget of lint may be secured by a bandage round the thorax.

Almost the only unpleasant symptom which follows the removal of the fluid is spasmodic cough, which often comes on in severe, and at times painful paroxysms. Syncope is scarcely ever noticed, if the patient be kept in a state of absolute rest after the operation. The internal remedies, especially the diuretics, should be continued, and Trousseau recommends that the side should be painted with tincture of iodine.

When we have reason to believe that the effusion is purulent, which, as we have already remarked, is very frequently the case in childhood, there are some points of difference in the operation. Thus we can have no hope that the effusion will not form again, and either require a second operation, or, as frequently happens, cause the cicatrix of the first puncture to reopen. Again, before the case is brought to a successful termination, it is usually necessary to employ some medicated injections to alter the character and secretion of the pleural surfaces.

It is doubtful, therefore, whether the admission of a small quantity of air is very objectionable, although West believes that it almost always converts the previously healthy pus into a highly offensive sero-purulent discharge. The ill effects of this can be overcome by the injections to be recommended below; but, on the other hand, care must be taken not to admit so much air as would interfere with the expansion of the lung. It is advisable on the whole, however, to perform the first puncture with the same care, and to employ the same dressing as in the case of serous effusion. But if a second puncture is required, or if the first one reopens, the wound should be enlarged so as to admit a good-sized canula, which should be allowed to remain. This canula should be of silver, curved so that its extremity may not come in contact with the gradually expanding in the same region. The displacement was so remarkable that the mother discovered it herself, as we had avoided telling her, to save her from anxiety. The new position of the heart did not seem to produce any inconvenience in addition to that occasioned by the pleuritic effusion. During the last two weeks of March the child was kept in bed; his diet was milk and bread; a large Burgundy pitch plaster was kept on the side, and he took internally, vinegar of squill and tincture of digitalis.

Finding that the effusion remained stationary under this treatment, we prescribed a grain of iodide of potassium three times a day, in a teaspoonful of compound syrup of sarsaparilla. The diet was changed at the same time. He was allowed small quantities of meat every day, and was taken from bed and placed in a chair by the window. Under this treatment he gradually improved, so that by the 27th of March, when we paid our last visit, the effusion had in great measure disappeared, and he was able to play about the room all day. The side was slightly contracted: the respiration was pure and vesicular, but rather more feeble than on the left side; the heart had returned to its natural position.

We examined this child in the course of the year 1852, and found him to be in excellent health. Excepting a slight contraction of the left side, there was no perceptible difference between that side and the right.

## ARTICLE V.

### HOOPING-COUGH, OR PERTUSSIS.

DEFINITION; SYNONYMES; FREQUENCY.—Hooping-cough is characterized by a hard, convulsive cough, occurring during expiration, and accompanied by long, shrill, and laborious inspirations, which are called hoops. The cough occurs in paroxysms, which are terminated by the expectoration of tough phlegm, and often by vomiting.

The disease is known by various other names, of which the most common are tussis ferina, chincough, and kincough. The *frequency* of the disease is exceedingly variable, as it occurs both in the sporadic form and as a widely-prevailing epidemic. Some idea of its frequency may be gained from the facts that, during the five years from 1844 to 1848, inclusive, there were 390 deaths from it in Philadelphia, under 15 years of age, out of a total mortality of 31,162. During the past five years, 1864 to 1868 inclusive, there have been out of a total mortality of 76,354, 543 deaths from hooping-cough; a proportion considerably smaller than that during the first period of five years above-mentioned. The irregularity is even more strikingly seen by comparing single years with each other: thus, while in 1867, there were but 65 deaths from this cause, there were no less than 208 in 1862.

CAUSES.—AGE.—It occurs generally in children, and may be met with in the first weeks of life; indeed, Watson, in his lectures, mentions a case where the mother, during the last week of her pregnancy, lived in a house where the disease was prevalent, and her infant hooped the very day it was born. Of 208 cases in children, in our own private practice, 26 occurred in the first year of life, 147 between the ages of 1 and 7 years, and 35 between 7 and 12 years. To be more explicit, we will state that of 188 cases in which the age was accurately noted, 11 occurred in the first six months of life; 9 between 6 and 12 months; 30 in the second year; 17 in the third, 32 in the fourth, 17 in the fifth, 30 in the sixth, 16 in the seventh, 13 in the eighth, 8 in the ninth, 3 in the tenth, and 1 in the eleventh and twelfth years of life each. Of 130 cases in children, collected by M. Blache, 106 occurred between 1 and 7 years of age, and only 24 between 8 and 14. Of 29 cases observed by MM. Rilliet and Barthez, there were 26 between 1 and 7 years, and 3 between 8 and 12. It is stated by MM. Blache, Rilliet and Barthez, and Valleix, to be most common in girls. Of 208 cases observed by ourselves, 106 occurred in boys, and 102 in girls. Some writers have asserted that certain *constitutions* and *hereditary influence* predispose to the disease. So far as our own experience goes, it has seemed to attack indifferently those who were simultaneously exposed to it. The fact of its being propagated by direct *contagion* is proved beyond doubt by numerous observations. We have rarely known one child in a family to be attacked without its extending to all the others not protected by having had the disease previously. That it often appears also in the form of an *epidemic*, is established by the testimony of many writers, so that at present no doubt is entertained upon this point.

SYMPTOMS.—It is customary to describe three stages of hooping-cough. The first is called the stage of invasion, or the catarrhal stage; the second the stage of increase, or the spasmodic stage; and the third the stage of decline, which is characterized by an amendment of all the symptoms.

*First stage.*—The great majority of the cases begin with the ordinary symptoms of simple catarrh. These are coryza, sneezing, slight injection of the conjunctivæ, and dry cough. The cough rarely has any peculiarity in the beginning which will enable us to distinguish it from that of an ordinary cold, though some persons have asserted that they could recognize it. We have often listened with great care to the sound of coughs which parents supposed might be hooping-cough, but were always obliged to confess our inability to determine, until time gave them more decided characters. In addition to the symptoms enumerated, there is generally more languor, lassitude, drowsiness, and irritability, than are commonly present in simple catarrh. In a small proportion of cases the first stage is wanting, and the disease assumes its peculiar features from the first. The duration of this stage is very uncertain, and is ascertained with difficulty. Our own experience would fix it at about two weeks as the average, though it may last undoubtedly a much shorter or longer period. The earliest period at which we have known the distinctive hoop of the disease to be heard was in three days. In another case it was five days. We have also known it to appear at a later period than usual. In a good many instances it has been as late as three weeks, but very rarely later.

*Second stage.*—At the beginning of this stage the disease has assumed its peculiar convulsive and paroxysmal character. It consists of violent fits or paroxysms, or, as they are often called, kinks of cough, recurring after longer and shorter intervals. Just before the paroxysm the child seems restless, anxious, and irritable, or else keeps perfectly quiet and evidently tries to retard its approach. When it begins, the child, if lying down, rises up suddenly, or if playing about runs to take hold of some fixed object, by which to support itself during the accession. The cough is dry, spasmodic, and sonorous, and occurs in a succession of short, rapid expirations, by which the thorax seems to be emptied of all its air, with violent efforts. It is followed by one or two long and deep inspirations, which are accompanied by the peculiar hoop to which the disease owes its name, and which are caused by the drawing of the air rapidly and forcibly through the narrowed glottis, which is spasmodically closed. During the fit the face becomes deeply suffused or even purple, and swollen; the eyes are watery, and the countenance is expressive of great anxiety, and after the fit is over, of fatigue and exhaustion. The latter symptoms are, as M. Valleix remarks, the signs of partial asphyxia, and are the result doubtless of the complete expulsion of air from the thorax, and a consequent partial suspension of the function of hæmatosis. There is almost always an expectoration of colorless ropy fluid, often accompanied by vomiting, at the close of the fit of coughing, and the patients usually appear weak and languid for a short time, after which they return to their play.

In very severe cases there are other symptoms in addition to those just mentioned. *Hemorrhages* from the mouth, ears, nose, lungs, and beneath the conjunctivæ, are not unusual. We have ourselves seen several instances of epistaxis, one of effusion into the eyelids, a few of extensive subconjunctival ecchymosis, and we are well acquainted with the history of another case, in which there was bleeding both from the nose and ears. In one case, in a girl between five and six years old, that occurred to one of ourselves, in which the paroxysms were violent, the spells were accompanied in the latter half of the fourth and in the fifth week, by a discharge of a good deal of blood from the mouth. This took place particularly during the night-spells, so that in the morning the basin would contain several teaspoonfuls of blood. It was not from the nose. It was bright in color, pure, except that it was intermingled with sero-mucous expectoration, but it was not intimately blended with the sputa, nor was it streaked through the mucus as it sometimes is in the pneumonia of children. On one occasion it was seen to fly from the mouth in a little spirt, as though from a vessel. The child was lively and well all this time, playing about, eating well, strong, not thirsty, without pain, not oppressed between the spells, and sleeping naturally between the paroxysms at night. The only altered physical sign was slight dulness on percussion over the upper part of the right lung behind, with some subcrepitant râle at that point, but without bronchial respiration. After lasting twelve days, it ceased; the child got well gradually, and continues strong and hearty to the present time. The attack occurred in January and February of 1849. In another, in a girl two years of age, which came under our own observation, a species of syncope, a state of insensibility without convulsive movements, accompanied by great paleness, occurred after many of the paroxysms.

We have met with general *convulsions* in 12 cases, 5 of which proved fatal. In 2 other cases, both occurring in infants under six months, the paroxysms of cough were accompanied by the most violent struggling and oppression, and by deep blueness of the hands and feet, like that of severe cyanosis.

In some instances, after the paroxysm is apparently over, the child will begin within a few instants to cough again, and may in this way have several fits in such rapid succession as to make an almost continuous paroxysm. It is quite common for this to happen twice, and in one case which we saw, it occurred three times on several occasions. The ordinary *duration* of a paroxysm or kink, is from a quarter to three-quarters of a minute, though it may last as long as two minutes, or according to some even longer. In a case that occurred to ourselves, one paroxysm lasted the extraordinary period of fifty-five minutes. That it was really a paroxysm of the disease, we are quite sure, as it chanced that we reached the house shortly after it began, and witnessed the greater part of it ourselves. The number of accessions in twenty-four hours is very irregular. It depends chiefly on the stage and violence of the attack. During the height of the disease, we have generally found them to number about 40. In some rare cases, however, they are much more numerous, and amount to 70 or 80. They are generally most frequent in the course of the third or fourth week, after which they remain stationary as to frequency for several days, or for two or three weeks, and then decline gradually. The paroxysms may occur spontaneously, the child being often disturbed from sleep by their sudden occurrence, or they may be excited by various circumstances, such for instance as contrarieties, a fit of crying, change of position, eating, violent exercise, and imitation. We have frequently seen an attack brought on by the sight of another child in a paroxysm of the disease. The duration of the second stage may be stated to be about 30 or 40 days in most cases.

*Third stage.*—It is impossible to fix a precise limit from which to date the beginning of this stage. It is generally, however, said to commence from the time when the disease is evidently on the decline. The paroxysms now grow less frequent and less violent, the cough reassumes some of the catarrhal features which it had at first, and gradually loses its peculiar spasmodic character. The child's general health improves, the appetite becomes vigorous, the strength is invigorated, the sleep again becomes sound and tranquil, and the disease disappears. The *duration* of this stage is uncertain, like that of the two others. MM. Rilliet and Barthez state it to be short in uncomplicated cases (ten to fifteen days), and are of opinion that when it has been supposed to have lasted several weeks or months, it has been the result of some complication, as chronic dilatation of the bronchia, tubercular disease, &c. It happens not unfrequently, however, that after the disease has apparently ceased, all the distinctive characters of the cough recur, if the child chance to take cold within a few weeks or even longer after its disappearance.

In cases of pertussis unaccompanied by complications of any kind, there are no marked *general symptoms*. There is seldom any fever, the appetite continues good, and with the exception of occasional languor and fatigue, and irritability of temper, the child appears to be well.

*Urine.*—No accurate analyses of the urine in pertussis appear to have been made. Gibb and Johnston, however, state that they have found sugar in variable quantities in almost every case. This question appears well worthy of full investigation, since, if this statement is confirmed, it would link itself in the most interesting manner with the other evidences in this disease of irritation of the pneumogastric nerves, which are at least somewhat concerned in the glycogenic function of the liver.

The *total duration* of the disease, in simple cases, may be set down at from one to three months. We have never known a case to last so short a time as a month, and have rarely found the whole duration much within three months.

COMPLICATIONS.—Though it has happened to us, on several occasions, to meet with children who have been very ill from the violence of the disease under consideration in its uncomplicated condition, we have never known a case to prove fatal except in consequence of some kind of complication. It is exceedingly important, therefore, that the various accidents apt to occur in the course of the disease should be carefully considered.

*Convulsions.*—This complication is not a rare one, since it occurred in 5 of 29 cases observed by MM. Rilliet and Barthez, and in 12 of 208 observed by ourselves. It is one of the most dangerous accidents liable to occur in the course of the disease. Of the 7 cases reported by the authors quoted (5 of their own, and 2 belonging to M. Papavoine), 6 died. Of our 12 cases, 5 died. In all that we have seen, the convulsions were general, extremely violent, and accompanied by insensibility in the fatal cases to the last, and in the favorable ones, during from a few minutes to half an hour. In two of the fatal cases the pertussis had lasted nearly two months, and was accompanied by extensive bronchitis. The fatal event took place within twenty-four hours from the supervention of the spasms. The subjects were eight and nine months of age respectively. In the third case, the convulsions came on in the seventh week of the disease, in a child who had been laboring for a number of days under bronchitis. They ended fatally in seven hours. In the fourth they occurred in a child in the second year of its age, at the end of about four weeks, proved fatal in two days, and were caused by bronchitis and collapse of the lung-tissue. In the fifth case they occurred likewise in a child in the second year of life, were attended with violent laryngismus and contraction, and proved fatal in the third week of the disease.

One of the favorable cases occurred in a child five months old, who had been attacked with bronchitis three days before the occurrence of the convulsions, which came on during the height of a severe paroxysm of coughing. The convulsive movements were general, and continued for about half an hour, after which the child was drowsy or irritable for some hours longer. The hooping-cough continued to be severe for two weeks after this, as many as 42, 46, and 48 paroxysms occurring every day. At last, however, perfect recovery took place. The second favorable case was that of a girl between two and three years old, in whom a convulsion occurred in the third week of the disease, before the paroxysms had become violent, and evidently in consequence of an attack of fever dependent upon dentition. The seizure lasted only a few minutes, was followed by drowsiness for a few hours, but on the following day all the unpleasant symptoms had disappeared. In a third case, in a boy between two and three years old, a violent convulsion occurred at the end of the second week, at the beginning of an attack of pneumonia. The child remained very ill, and nine days afterwards had another convulsion, which was much slighter than the first. After this he gradually recovered. In a fourth case, in a girl between two and three years old, a slight but well-marked convulsion occurred at the onset of an attack of bronchitis, which took place at the beginning of the third week of the hooping-cough. The bronchitis proved to be very severe, but there was no return of the spasm, and the child recovered. In a fifth case, in a boy nine months old, a severe fit occurred in the sixth week, just after the child had been brought home from an expedition to procure his daguerreotype. It lasted fifteen minutes, and was attended with total insensibility, and purple discoloration of the face, but in half an hour after, the patient was nursing well, and was entirely conscious. There was no return of the convulsions, though the disease was very severe after this attack. In the sixth case, also in a boy nine months old, a slight convulsion occurred during one of the paroxysms in the fifth week, but was not followed by any bad consequences.

Amongst the complications ought to be ranked, we think, though this has not generally been done by writers, an excessive degree of the laryngismus which constitutes one of the natural and essential features of the disease. In some children, in fact, and especially in those of a nervous temperament, and in the anemical and debilitated, and, likewise, in certain epidemic types of the disease, this laryngismus assumes a degree of severity, which is not only distressing but positively dangerous. In one case that occurred to ourselves, in a child who had suffered many months before from laryngismus and contracture, the occurrence of hooping-cough reproduced the laryngismus, and after a few weeks caused death almost instantaneously, at the beginning of a paroxysm, as the child was sitting upon the floor, where it had been placed only a few moments before to play, it having presented before this no very threatening symptoms. In another case, in which we could detect no other complication, the spasm of the glottis was so very violent, that after a few days the spells were attended with convulsions, and very soon ended fatally. In a third, this symptom was so violent that in many of the spells the child ceased for the time to breathe, seemed to faint, became entirely unconscious, and had to be fanned and carried to an open window to be revived; this patient ultimately recovered. In a great many cases, this symptom without other complication, has been most distressing, and has required particular treatment.

*Collapse of the lung-tissue.*—The recent discoveries in regard to the pathological change in the pulmonary tissue called collapse, and especially a consideration of the causes by which collapse is produced, might well lead us to suppose that pertussis, and especially the bronchitis of pertussis, would be very apt to become associated with collapse. Late researches accordingly show that of all the lesions met with in hooping-cough this is much the most frequent and important. Dr. Graily Hewitt, of London, in a lecture on the pathology of hooping-cough, read before the Harveian Society of London, in 1855, shows "that the catarrhal inflammation of the bronchial tubes, which occasions hooping-cough, is, in fatal cases, attended almost universally with collapse of the lungs." He states that his observations were made upon nineteen subjects; whose age varied from four years to one month, the average being eighteen months. "In all, the state of the lungs was carefully noted. The chief lesion found after death was collapse of the lung-substance. The following is a statement of the degree to which this pathological condition manifested itself in the different lobes of the two lungs.

"In the *right lung*, portions of the upper lobe were found collapsed in six cases, and in four more to a less degree. The middle lobe was collapsed, wholly or in part, in sixteen cases. The lower lobe was more or less affected with collapse, in eighteen cases. In the *left lung*, the upper lobe presented the same lesion in fifteen cases, the whole of the anterior tongue-like prolongation being in most of the cases affected. The lower lobe was collapsed more or less in eighteen cases. In seven of the cases, the portions collapsed were also congested, in some to a high degree.

"The test of MM. Bailly and Legendre, viz., the inflatability of the portions of the lung thus affected, was used in almost all the cases; and on that and other grounds, it was determined, that the particular part of the lung in question was collapsed and not hepatized.

"It will be at once perceived, that the occurrence of collapse was almost universal; all the cases, with the exception of one, in which there was extensive tuberculization of the lungs, presenting a greater or less amount of lung-substance affected in this manner."

We have had but few opportunities of testing this matter for ourselves by post-mortem examinations; but in one case to which we were called in consultation, that of a boy not quite a year old, this lesion was shown, by autopsy, to be present to a great extent. The child had had the disease during three months with considerable severity. He was thought to be doing well, until he was taken one day a long drive into the country. After the ride he seemed very much fatigued, and that night was seized with very great dyspnœa, increased violence of the coughing spells, and after a short time with general convulsions. We saw him on the following day. He was breathing very rapidly and with much effort, there was a good deal of subcrepitant râle through the chest, the skin was cool, and about the mouth had a cyanotic tint, and he was unconscious. The same symptoms persisted through the day with occasional convulsive seizures, and on the following day he died. At the autopsy, there was found very extensive collapse of both lungs, as proved both by the anatomical appearances, and by inflation. There was no pneumonia, and very moderate bronchitis.

*Bronchitis* has always been supposed to be the most frequent complication of hooping-cough, and there can be no doubt that it is one of the most important. The recent discoveries of the existence and nature of collapse have shown, however, that many of the fatal cases, hitherto ascribed to bronchitis, or to bronchitis and pneumonia combined, must have been cases of collapse, so that large allowances must be made for all statistics collected before the discovery of the true nature of the last-named lesion.

There is, as has already been stated, a certain amount of pulmonary catarrh in every case of hooping-cough. This is a normal element of the disease. To constitute a complication there must be a true bronchitis, an inflammation of the bronchial mucous membrane, sufficient to produce the ordinary symptoms of that disease. This exists in a great many cases; MM. Rilliet and Barthez found it to exist either alone or combined with pneumonia in half of the fatal cases. Of the 208 cases observed by ourselves, it existed to a greater or less extent in 42. In 28 of these it was mild or only moderately severe, and of these all but one recovered. In 14 it was severe and very extensive, or else capillary, and of these 6 died. Of the fatal cases, it was in several no doubt attended with collapse of the lung-tissue. In fatal cases it has often been found accompanied by continuous dilatation of the smaller bronchia.

*Pneumonia*, according to the authors above quoted, is about as frequent as bronchitis. When, however, the fatal termination took place soon after the beginning of the disease (18th, 26th, or 27th days) it was not generally present. After these periods, on the contrary, it was almost always observed. As these authors, however, include, under the title of lobular pneumonia, many cases of bronchitis with collapse, it is clear that a large number of their cases of supposed pneumonia ought to have been ranged under the head of bronchitis. For our own part, we have met with only five well-marked cases of pneumonia. Two of these occurred in girls of seven and nine years old respectively, one in a girl between one and two years of age, a fourth in a boy between two and three years old, and a fifth in a boy in his ninth year. They all recovered. The degree of danger from this complication is in proportion to the earliness of the age at which the disease occurs, and to the extent of the inflammation.

*Emphysema* has been supposed by some to be a common result or accompaniment of the disease. This is denied, however, by others. We have never observed it ourselves, and as nearly all the children whom we have attended with pertussis continue under our charge, we should certainly have noticed it, were it of common occurrence.

*Vomiting* is a very frequent incident in pertussis, but ought not to be regarded as a complication, unless dependent on some disease of the digestive organs, or symptomatic of cerebral disease. Where it occurs in simple cases, or in those complicated with bronchitis or pneumonia, it has always seemed to us to be advantageous.

*Tuberculosis* and *scrofula* are not infrequently found to follow hooping-cough, in cases where a marked predisposition to these conditions exists. The tuberculous affection is most apt to take the form of pulmonary or bronchial phthisis. These sequelæ are frequently observed in hospitals, and among the ill-fed and feeble children of the poor, but are comparatively rare among the better classes of society.

DIAGNOSIS.—The diagnosis of pertussis is difficult only during the first stage of the complaint. It is impossible, indeed, to distinguish, during that stage, between it and simple mild laryngitis, or the mild catarrhal attacks which are so common in our climate. After it has once fairly entered upon the second stage, it is scarcely possible to confound it with any other malady. MM. Rilliet and Barthez state, however, that acute bronchitis with paroxysmal cough is not unfrequently mistaken for pertussis, and we recollect perfectly having made this mistake ourselves, in a little girl, five years of age. The cough assumed so exactly the features of pertussis, that after waiting a few days, we announced, authoritatively, the presence of pertussis. Only three or four days after this we were forced to take it all back, for the whole thing had disappeared, bronchitis, pertussis, and all. The patient was entirely well. But the mistake need seldom be made, if it be recollected that in acute bronchitis with paroxysmal cough, the invasion is sudden; that there is violent fever, great dyspnœa, and the physical signs of bronchitis; that the hoop is generally wanting, or feebly marked, and that the disease is violent and rapid in its course; all of which circumstances are widely different from what occurs in pertussis.

The same authors assert that tuberculosis of the bronchial ganglions gives rise to a cough which may be mistaken for pertussis. The following table extracted from their work will show the differences between the two disorders.

| PERTUSSIS. | TUBERCULOSIS OF THE BRONCHIAL GANGLIONS. |
|---|---|
| Often epidemic, attacking several children at once; transmissible by contagion. | Always sporadic; non-contagious. |
| Three distinct stages, of which only the second is accompanied by kinks. | No distinct stages. |
| Kinks attended with hooping, ropy expectoration and vomiting. | Kinks generally very short, without hooping, ropy expectoration or vomiting. |
| Pure respiration in the intervals between the kinks. | Physical signs of tuberculosis of the ganglions; but, in certain cases, absence of these signs. |
| In the intervals between the kinks, respiration and pulse natural, so long as the disease is simple. | Accessions of asthma in some cases, with the kinks; continuous febrile movement, with evening exacerbations, sweats, progressive emaciation, &c. |
| Voice natural. | Voice sometimes hoarse. |
| Course generally acute. | Chronic course. |

Prognosis.—Pertussis is rarely a dangerous or fatal disease so long as it remains simple. Of the 208 cases observed by ourselves, 143 were simple, all of which recovered. Nevertheless even the simple disease does sometimes terminate fatally, from the excessive violence of the paroxysms of coughing.

The danger in hooping-cough, which is considerable, depends, therefore, almost entirely on the complications which are so apt to occur, for which reason the physician should watch with the closest attention, in order to prevent their occurrence, and that he may recognize and treat them in their earliest stages. The most dangerous complication is convulsions, and after that bronchitis and pneumonia. So long as the child seems well and lively, and without fever or dyspnœa, in the intervals between the fits, there is nothing to be feared. But if, on the contrary, it becomes languid and irritable, with indisposition to take food, feverishness, and some increase of the rate of respiration, the practitioner should be upon his guard. A very early age and natural delicacy of constitution, are unfavorable circumstances in the disease. Some form of complication occurred in 65 of the 208 cases observed by ourselves. Of the 65, 12 died.

Five of the 12 fatal cases ended with convulsions. Of these 5 cases, the convulsions were caused by bronchitis and collapse of the lung in 4, the fatal result being the consequence, in fact, of the lung complication. One of the cases was independent, apparently, of disease of the lung (though, as no post-mortem examination was made, this cannot be asserted positively), but seemed to be the result of the violent laryngismus, with contracture and general convulsions, such as will be described in the article on laryngismus stridulus. Two of the cases occurred in children of eight and nine months old, respectively, and proved fatal in twenty-four hours after the setting-in of the convulsions. Two others occurred in children in their second year, and the fifth occurred in a boy between three and four years old, and caused death in seven hours.

Of the remaining seven fatal cases, one was the result of collapse of the lungs, supervening suddenly upon a mild bronchitis, in a twin child between two and three months old. The second was caused by tubercular disease of the lungs, in a child between three and four years old, and the remaining five by bronchitis, associated, to a greater or less extent, in all probability, with collapse of the lung. Of the last-mentioned five cases, one occurred in a child between five and six months old, and was rapid in its course; two occurred in children between one and two years old, one being rapid and the other lingering in its course; one occurred in the third year of life, and was attended with severe diarrhœa from teething, as well as with bronchitis and collapse; and the fifth occurred in a child in its fourth year, and was slow and gradual in its course. To sum up, it may be stated that of the 12 fatal cases, 10 were the result of bronchitis and collapse, 1 of tuberculosis of the lungs, and 1 of laryngismus stridulus.

Nature of the Disease.—There is no essential anatomical lesion in pertussis, except, perhaps, slight inflammation of the bronchial mucous membrane. In most of the cases, the membrane lining the larger and smaller air-tubes, and very rarely that of the trachea, is reddened and perceptibly thicker than natural, and the tubes contain a considerable quantity of frothy mucus, or a thick, viscid, and tenacious phlegm.

As to the nature of the disease, it seems to us very clear that it ought to be regarded as comprising two elements of morbid action, one of which consists in slight inflammation of the respiratory mucous membrane, and the other of disordered action of the respiratory system of excito-motor nerves. It is neither a pure neurosis nor a pure inflammation, but partakes of the characters of both, and much more of the former than of the latter. The authors of the *Compendium de Médecine Pratique* (t. ii. p. 526) regard it as a neurosis, on the following grounds: 1. "In the greater number of cases the respiratory apparatus presents no kind of alteration, or else the lesions are so multiplied or variable, that they are surely not the real origin of the disease. 2. The clearly remittent course of the symptoms, and the tôtal absence of fever, unless some complication is present, are not observed in ordinary or even specific inflammations. 3. The cessation or sudden return of the paroxysms, under the influence of moral emotions or change of place, belong to a disorder of innervation, and not to inflammation, which commonly passes through certain stages before it is resolved. 4. The complete return to health, the integrity of all the functions in slight cases, the resistance which it opposes to treatment, the uselessness of antiphlogistics, and the success obtained from narcotics and antispasmodics, are all so many circumstances peculiar to hooping-cough and to many of the neuroses."

It has, however, so many points of resemblance to the various constitutional diseases, as its undoubtedly contagious nature ; the facts that it runs a definite course, and that one attack protects the system against a second; that it also probably depends upon a morbid state of the blood. due to the introduction of some specific poison which possesses the peculiar power of irritating the pneumogastric nerves.

Treatment of Simple Pertussis.—Hooping-cough, like all other diseases, varies greatly in its degree of severity. It is sometimes an affair of no consequence scarcely, the patient passing through its stages without suffering, and without any injurious consequences whatever to the general health. We have known a large family of children to pass through the disease without other treatment than attention to a prudent hygiene, and with no other medicine than a few doses of a mild cathartic, given to relieve some uncomfortable gastric symptoms. We have known one child in a family where the disease was prevailing at the time, to have the cough for only five weeks, and to hoop only on two or three occasions, and to lose neither appetite nor spirits for a moment. Such cases evidently need no interference, and a wise physician will, in such, order no drugs. His business will be simply to direct that the child be guarded against cold and against imprudences in diet.

In other instances the disease assumes, from a very early period, or sometimes not until later, a character of a very different kind. Without any complication whatever, the natural symptoms of the disease develop in great intensity. The spells of coughing are very frequent, very violent, and very long-continued. Instead of some twenty spells or less in twenty-four hours, as is the rule in mild and moderate cases, the patient will average two or more every hour, having fifty or sixty spells in the day. The laryngismus, instead of being slight will be violent and distressing, so that in lieu of three, four, or five hoops in a paroxysm, there may be fourteen or fifteen, and these so shrill, acute, and prolonged, as greatly to exhaust the poor little patient. Or the laryngismus may be so intense as to close for a few seconds the glottis, and arrest entirely the respiration, giving rise to the most painful attacks of struggling and suffocation possible to behold. Or the vomiting may be so frequent as seriously to interfere with the nutrition of the child, and thus cause threatening and even dangerous debility. In certain families, and in certain epidemic types of the disease, it assumes these severe features, and such cases must take the same rank in this disease, that grave cases of scarlet fever, measles, or variola, take in those affections.

Cases of this latter kind imperatively demand treatment, and they are, we are happy to state, susceptible very generally of great and striking alleviation, by the use of proper means,—means, too, which in themselves are very safe.

At one time we were very much disposed, we confess, to avoid all interference so long as we saw no complication in the case, under the supposition that the disease in its simple form was always safe, and might be trusted to the efforts of nature. More enlarged experience has taught us, however, that the very violence of the disease, even in its simple form, was a source of danger; and that, moreover, such were much more liable than milder ones to complications, while a proper treatment, instituted so soon as the disease began to show these severe characters, has almost always, after a few days' perseverance, brought about and maintained a most evident amelioration of the symptoms, thus keeping within due bounds a development which might otherwise have gone on to a disastrous termination.

*Bloodletting.*—Depletion is very rarely necessary in simple pertussis. The only cases in which it can be called for are those occurring in sanguine children, where the laryngismus is so extreme and the paroxysms so violent as to lead to great engorgement of the right side of the heart, and even to endanger the brain by over-distension of the veins. Under these circumstances, we might resort to venesection merely for the mechanical relief afforded, as recommended under similar conditions in pneumonia. In such cases only then, a small bleeding, or the application of a few leeches to the temples or behind the ears, may be proper; but even these may generally be safely treated by reduced diet and by a few doses of saline cathartics, without a resort to the more powerful and more permanently exhausting means of depletion. As for the treatment of simple pertussis by repeated venesections, in the hope of curtailing its duration, or under the idea of their being rendered necessary by the violence of the malady, it seems to us forbidden by the present state of medical knowledge, which informs us that the greater number of the cases do not endanger life so long as they remain simple, however violent they appear to be. Of the 143 simple cases treated by ourselves, depletion was not used in any, and all recovered.

*Antispasmodics.*—Various remedies of this class have been employed in this disease with apparent success. We have usually obtained such satisfactory results from other means, hereafter mentioned, that we have comparatively rarely resorted to these remedies. We have, however, used *assafœtida* in a number of instances with decided benefit, both in relieving the general restlessness and in moderating the number and severity of the paroxysms. The doses in which we have given it are either two or three grains in pill, or a teaspoonful of the mistura assafœtidæ, three or four times a day to a child of four years old.

*Narcotics.*—Of the various narcotics which have been more or less extensively employed, the most important are belladonna, opium, and hydrocyanic acid. *Belladonna* is highly recommended by several German authors, by MM. Rilliet and Barthez, who state that it is beyond contradiction the one most deserving of confidence, by Trousseau and Pidoux, and by numerous English and American writers. MM. Trousseau and Pidoux employ the following formula:

| | |
|---|---|
| ℞.—Pulv. Belladonnæ, . . . . . . . | gr. iv. |
| Extract. Opii Aquos., . . . . . . | gr. iv. |
| Extract. Valerianæ, . . . . . . . | ʒss. |

M. et div. in pil. no. xvi.
S. One to four in the course of the day.

If the child dislike the pilular form, they give it in syrup, according to the following formula:

| | |
|---|---|
| ℞.—Extract. Belladonnæ, . . . . . . | gr. iv. |
| Syrup. Opii, | |
| Syrup. Flor. Aurantii, āā . . . . . | f℥j.—M. |

Of this, from one to eight teaspoonfuls are to be given in twenty-four hours.

We have ourselves used belladonna in a very large number of cases of hooping-cough, and with such unquestionable benefit, that we regard it as one of the most valuable remedies for this disease in our possession.

We have certainly never seen it cut short the course of the disease, as it has been asserted to do, but we have almost invariably found it to moderate the laryngismus, shorten the paroxysms and diminish their number, and probably also shorten the duration of the attack. We have not, however, been in the habit of prescribing such large doses of belladonna as those quoted above (gr. $\frac{1}{4}$); but have usually given it in combination with alum, in the dose of $\frac{1}{24}$th of a grain of the extract, every four hours to a child of one year old. The formula which we employ will be found in our remarks upon the use of alum.

Belladonna has also been largely used, especially by Dr. Fuller, in combination with sulphate of zinc, and with excellent results. This latter author states that he has observed a remarkable tolerance of belladonna in children, so that, beginning with quite large doses, the amount may be rapidly, though carefully, increased until the quantity taken exceeds one of all proportion, the corresponding doses which will be tolerated by adults. Even when given, however, in the comparatively small doses of $\frac{1}{24}$th or $\frac{1}{12}$th of a grain, it is necessary to watch for any symptoms of the toxic action of the drug, so that its administration may be suspended or the amount diminished.

*Opium* is confessedly a very valuable remedy in the disease, not as a curative, but as a sedative and palliative. When the cough is frequent and fatiguing, especially if the patient have an irritable and nervous constitution, some opiate preparation is of the utmost service in moderating the frequency and violence of the paroxysms, and in allaying irritability and restlessness. It is best given in the evening, and in combination with ipecacuanha.

*Hydrocyanic acid* has been employed by various observers, and is highly spoken of by some. Its poisonous properties, however, have deterred many, and amongst them, ourselves, from resorting to it. Inasmuch as there are other and safer means for conducting the disease to a favorable termination, it seems to us useless to venture upon so potent a preparation as this. Dr. Atlee, of Lancaster, gave it in the following formula:

| | |
|---|---|
| ℞.—Acid. Hydrocyan., . . . . . . . | ♏j. |
| Syrup. Simp., . . . . . . . | f℥j.—M. |

A teaspoonful to be given morning and evening, and if no uneasiness, dizziness, or sickness be produced within forty-eight hours, the dose to be repeated three times a day. This prescription is for a child six months old; one drop of the acid being added for each year of the child's age beyond one year. He has never repeated the dose more than four times a day. (*Condie's Dis. of Child.*, 2d ed., p. 337.)

*Emetics* and *Nauseants* are amongst the most important remedies in the treatment of hooping-cough, since they exert a powerful influence upon the disease, and unless carried to excess, are not in themselves likely to be injurious. Some authors recommend the administration of an emetic every day or every other day, while others give them according to the necessity of the case. Believing that frequently repeated emetic doses are unnecessarily severe, and productive of too much fatigue and exhaustion, we have preferred in the simple disease to give only small doses of ipecacuanha from time to time, so as to moderate the violence of the cough. Tartar emetic is never necessary, and ought to be avoided, on account of its disposition to irritate and inflame the gastro-intestinal mucous membrane, and because of its exhausting effects on the general economy. The syrup of ipecacuanha is the preparation we have almost always used. From ten to twenty drops, given three times a day to a child three years old, will very generally moderate the severity of the paroxysms.

*Purgatives* are necessary in the simple disease only when constipation is present. The mildest ought to be preferred, in order to avoid irritation and exhaustion. Castor oil, magnesia, or syrup of rhubarb are the best.

Among other remedies which have been highly recommended, but which we have never found it necessary to resort to, may be mentioned the following:

*Sulphur* is much used by some German authorities, who greatly commend its effects both at the beginning and throughout the course of the disease. It may be given in powder diffused in milk or syrup, or in emulsion, in doses of three grains, two or three times a day, to children from two to four years of age.

*Subcarbonate of Iron* has been successfully employed by Dr. Steyman, and by Lombard, of Geneva.

*Dilute Nitric Acid*, first recommended by Arnoldi, of Montreal, has been highly praised, especially by Gibb.

*Conium* has also been frequently used, both alone and as an ingredient in formulas containing some of the other remedies here mentioned, and appears to alleviate the violence of the paroxysms, though to a less marked degree, we believe, than belladonna.

Finally, of late years the *Bromide of Ammonium* has been recommended, especially by Gibb and G. Harley, as a pharyngeal and laryngeal anæsthetic, to diminish the spasm of these parts, while, at the same time, the alkali acts by rendering the secretion from the bronchial mucous membrane more free and readily expectorated. The *Bromide of Potassium* acts in the same way, and is productive, probably, of equally good results.

*Inhalations.*—It was noticed in France, some years ago, that children suffering with hooping-cough, who lived in the neighborhood of gas-works, were rapidly cured; and the plan has been recently tried with success, of sending patients with this disease to inhale the fumes arising during the purification of gas, which contain ammonia, vapor of tar, and several volatile oils. Dr. Bertolles (*British Med. Jour.*, Nov. 5, 1864) states, that "the register of the gas-works at Ternes, shows that during the previous six months, 901 patients have been subjected to the vapor treatment, of whom 219 were cured and 122 relieved." M. Commerege (*id. loc.*) has also reported the effects observed in 142 children who were brought under the action of the gases in the gas-works at St. Maudé; and believes that the treatment produces excellent results at all stages of the disorder. In general, twelve séances, each of which should be of two hours' duration, are required for the cure. We have ourselves known of quite a number of instances among the children of the poorer classes in this city, where patients, suffering with hooping-cough, have been allowed to inhale the fumes from the gas-works, and have experienced positive benefit.

LOCAL APPLICATIONS.—*Revulsives.*—The milder revulsives are useful in certain complications of pertussis, and as palliatives. To make them the chief basis of the treatment, however, which has been done by some, is a mistake. In order to produce a decided impression upon the disease, it would be necessary to resort to the more powerful remedies of this class, such as moxas, issues, tartar emetic ointment, blisters, &c., the use of which is not warranted by the nature of the disorder.

When the laryngismus has been severe, we have known the use of a belladonna plaster, 2 by 3 inches, applied over the larynx and worn for several days, to afford relief.

*Topical applications* to the interior of the larynx of solutions of nitrate of silver have been used by several practitioners, as by Gibb and Eben Watson, and apparently with much benefit. The strength of the solution should vary according to the stage of the disease, being much reduced during the early acute period.

*Tonics.*—In a number of cases that have come under our notice, the patient has grown pale and weak in the course of the disease, and this without any local complication, but from the disturbance of the digestive system that often exists to a greater or less extent, from the great frequency of the vomiting, which prevents them from taking a sufficient amount of nutriment, and from the exhausting effect of the violent muscular exertion undergone during the paroxysms. In such instances, when there has been no fever, or merely a little evening febricula, we have employed tonics with much advantage, and never to the injury of the patient. We have generally made use of Huxham's tincture of bark, either alone, in doses of from ten to twenty drops three times a day, or in connection with the syrup of the iodide of iron, or half a grain of the metallic iron (Pulv. Ferri). When the appetite has been very feeble, we have found that quinine, in the dose of a grain three or four times a day, at the age of three or four years, has restored it more rapidly than any remedy we have made use of.

Before concluding our remarks upon the treatment of simple hooping-cough, we wish to state that cases of the disease occur not unfrequently of so mild a form, as to need absolutely no treatment other than the proper degree of attention to hygiene; and that others again, more numerous than those just mentioned, will be met with, in which the only treatment necessary is the use, for a few days or weeks, of some mild expectorant and opiate at night to lessen the severity of the paroxysms, or of moderate doses of alum, belladonna, or carbonate of potash.

In infants particularly it is proper to give as little medicine as possible, allowing the disease to go on without interference so long as it progresses safely. In a good many mild cases, small doses of paregoric and syrup of ipecacuanha, constitute the only remedies we have found necessary in the cases of infants. When, however, the paroxysms become numerous and violent, exhausting the strength of the child and distressing its nervous system, we must make use of some remedy to allay the severity of the attacks. We have found the alum and belladonna formula recommended above safe and effectual. At the age of two and three months, we have usually given from half a grain to a grain of the former, combined with $\frac{1}{24}$th grain of extract of belladonna, three times a day, taking care to suspend it for a day or two if it caused troublesome vomiting or purging, and then resuming it in diminished dose. Or we have made use of a quarter or half a grain of carbonate of potash, also combined with the twenty-fourth part of a grain of the extract of belladonna, three or four times a day.

TREATMENT OF THE COMPLICATIONS.—If any of the diseases which have been mentioned as apt to occur during pertussis should arise, the treatment which is proper for them in their idiopathic form must be adopted without regard to the hooping-cough, with the following reservation: that care must be taken not to use means of too powerful and exhausting a nature, or such as have a tendency to irritate the organs with with which they come in contact. For, it must be recollected, that after the complication is cured, the patient has still the original disease to go through with, and therefore requires all his strength; and, moreover, the various organs of the body are predisposed, by the very fact of the existence of the original malady, to assume diseased action, should any irritation in the shape of a violent remedy be applied to them.

The cases of *bronchitis* which came under our observation were treated in the simplest manner. The children were put to bed, the diet carefully regulated, the bowels gently opened with castor-oil or syrup of rhubarb, and small doses of syrup of ipecacuanha or antimonial wine, with sweet spirits of nitre, were administered every two hours. Mustard poultices were applied once or twice a day to the interscapular space, and mustard foot-baths used every night, or more frequently, if the dyspnœa were considerable. If the bronchial secretions were very profuse, and the cough troublesome, the decoction or syrup of seneka was given in connection with occasional doses of laudanum or paregoric.

The treatment of *collapse* should be that which is recommended in the article on collapse, modified, of course, as may be rendered necessary by the existence of the hooping-cough. A mild emetic, if the patient seem strong enough to bear one; counter-irritants, and especially sinapisms or mustard poultices applied to the chest, nutritious food, and mild stimulants, as brandy, wine-whey, tincture of bark, quinine, or aromatic spirits of ammonia, must form the principal means of treatment.

The complication of *pneumonia* should be treated somewhat differently. In the 5 cases we have met with, the treatment employed consisted in the administration of small doses of antimonial wine and spirit of nitrous ether, and of Dover's powder, and in the use of the foot-bath; and, in addition, one, the eldest, was bled at the arm, and three others were leeched upon the chest; they all recovered. At the present time we should advise the use either of the combination of sulphurated antimony and Dover's powder, or of one of the alkaline mixtures, recommended in the article on pneumonia, in conjunction with external applications and the use of the foot-bath; and should not resort to bleeding, whether local or general, unless the indications, elsewhere laid down as calling for depletion in pneumonia, should be present in a marked degree.

When *convulsions* occur they must be treated according to the cause which produces them, and the constitution and present state of the child. If the patient be strong and sanguine, and not exhausted by previous sickness, the treatment should consist of depletion by leeches to the temples, or behind the ears; of cold applications to the head; the warm bath; cathartics or purgative enemata; and revulsives in the form of sinapisms, or of a small blister to the nucha. If, on the contrary, the patient is of delicate constitution, or exhausted by long illness, and especially when the convulsions are the result of extensive collapse of the lungs, occurring spontaneously or supervening upon bronchitis, we must be content to resort to warm baths, revulsives, antispasmodics and anodynes, stimuli, and stimulating enemata.

Of the 12 cases of convulsions that came under our notice, 5 proved fatal. Two of the fatal cases occurred in children who had long been laboring under bronchitis, probably associated with collapse, that had baffled all treatment. Death took place within twenty-four hours from the appearance of the convulsions, which were in fact the result of the diseased condition of the lungs. No treatment further than the warm bath and sinapisms, was resorted to. In the third case, the convulsions came on in the seventh week of the disease, in a child who had been laboring for a number of days under severe bronchitis; they ended fatally in seven hours. The treatment employed at the beginning of the fit was a warm bath, an enema, and mustard plasters. After a few hours, solution of morphia with fluid extract of valerian were given by enema, cold was applied to the head, and a blister to the nucha. In the fourth case, which occurred in a child in the second year of its life, they were caused by bronchitis and collapse, and proved fatal in two days. The treatment consisted in the use of warm baths, counter-irritants, alum, and small doses of brandy. The fifth case likewise occurred in the second year. This was one in which all the symptoms of laryngismus stridulus,—prolonged laryngismus, contracture, and general convulsions,—were added to those of the primary disease. It was treated with belladonna, opium, assafœtida, and warm baths, but all to no effect.

Of the favorable cases, one occurred in a boy five months of age, on the third day of a severe attack of bronchitis. The child was immediately placed in a warm bath, and large sinapisms applied over the front of the chest and upon the extremities, when the convulsions ceased. After this he was treated with half-grain doses of alum, repeated every three or four hours, mustard foot-baths and poultices, and small doses of wine of opium. On the sixth day of the attack, the third after the convulsive seizure, there having been no return of the convulsions, the bronchitis subsided with copious sweats and cold hands and feet, for which small quantities of brandy and water and wine-whey were used. The recovery was perfect. A second case occurred in a hearty boy nine months old, and seemed to depend on congestion of the brain, brought on by a severe fit of coughing. In this instance a venesection to a small amount was performed, the child was placed in a warm bath, and cold applied to the head. No return of the spasms took place, and the child recovered without difficulty. In another case the convulsion was caused by an attack of fever depending on dentition, and was treated by lancing the gums, by a warm foot-bath, and by the administration of a grain of calomel in a teaspoonful of castor oil. In the fourth case the convulsions were caused by pneumonia, and were managed by treating the pneumonia, except that at the moment of the attack a warm bath and a stimulating enema were made use of. In a fifth the convulsion, which was a short one, occurred at the onset of an attack of bronchitis. No particular treatment beyond what was necessary for that disease was required. In a sixth, in a boy nine months old, the convulsion occurred suddenly, was violent, and lasted fifteen minutes. The cause could not be ascertained. The only treatment used for the convulsion was a warm bath. There was no return. In a seventh case, in a boy nine months old, a slight convulsion occurred during one of the paroxysms in the fifth week. No treatment was necessary, as the attack was very short, and there was no recurrence of the symptoms.

HYGIENIC TREATMENT.—This part of the management of the disease is of the highest importance, for it is by careful attention to its details, that the complications which constitute the chief danger of the malady are to be prevented. In a considerable number of cases of pertussis, nothing more need be done than to insist upon strict attention to hygienic rules. The chief indications are, to preserve the child from taking cold, and to prevent indiscretions in diet. The clothing ought to be warm, and during the autumn, winter, and spring, flannel should always be placed next to the skin. The child ought to be kept in the house during damp weather at all seasons, and whenever, during the winter season, it is intensely cold. The diet should be nutritious, but of easy digestion. All heavy, rich food ought to be absolutely forbidden during the continuance of the malady.

TREATMENT OF THE PAROXYSM.—It often happens that the paroxysms are so violent, that the child seems to be in imminent danger of suffocation or of convulsions. This is especially true of infants. In six cases that we have seen, in infants under six months old, the kinks lasted so long, and the spasm of the larynx was so unyielding, that the children struggled as though laboring under tetanus; the countenance was disturbed and anxious; the face and hands, at first flushed, became purple from deep congestion; and on some occasions the breathing was suspended for several seconds, so that life *seemed* for the time in the greatest danger. The difficulty in these cases depends on the spasmodic closure of the glottis, which is, sometimes, no doubt, completely shut. We have never known these alarming symptoms of asphyxia to occur when the hoop has been clear and distinct, for when that is present, the larynx cannot be very tightly closed.

When the symptoms above described occur in a child several years of age, the patient should be raised and supported in the sitting posture; when in an infant, the child ought to be held lightly in the arms, so that it may take any position which instinct prompts it to. At the same time cold water ought to be sprinkled from the fingers upon the face, the child should be gently fanned, or, if the weather be warm, taken to the open window; and if there be time, it is well to put the feet into mustard-water. It has been recommended on such occasions to apply compresses dipped into cold water to the sternum. We would propose the trial of a means which the late Dr. C. D. Meigs found very successful in arresting tonic spasm of the respiratory muscles, in a case of laryngismus stridulus. This is the sudden application of a piece of ice wrapped in linen to the epigastrium. When the laryngeal spasm is very intense and obstinate, a belladonna plaster, as before recommended, or a small blister to the front of the neck, may be useful in controlling it.

M. Bell speaks very highly of the results obtained by sprinkling a little ether on the clothes of the patient at the onset of the paroxysm; and Dr. Churchill (*Diseases of Childhood*, p. 223), who has tried ether in 12 or 14 cases, and chloroform in 6, regards it as a valuable addition to our remedies. He directs that about half a drachm of sulphuric ether should be spilled on the nurse's hand and held before the child's nose and mouth at the commencement of a fit of coughing. In only one or two cases no benefit accrued, while in others great mitigation of the spasm, and in three or four almost complete relief followed when the ether was thus applied. We should certainly recommend a trial of this procedure, making use, however, from preference, exclusively of the sulphuric ether.

# CLASS II.

## DISEASES OF THE CIRCULATORY ORGANS

### ARTICLE I.

### CYANOSIS.

**Synonymes.—Definition.**—This peculiar condition, known under the various names of Morbus Cœruleus or the blue disease, and Cyanosis, may be defined as a permanent state of lividity or blueness of the skin, depending upon numerous malformations or derangements of the heart and great vessels.

In a comparatively slight degree, this condition attends many of the chronic organic diseases of the circulatory organs; and is also transiently present in the course of some acute diseases; but under neither of these circumstances does the lividity merit consideration as a separate affection, being merely due to the imperfect oxygenation of the blood.

There is, however, one form of cyanosis which we have occasionally met with that merits a special reference. In these cases, the blueness of surface has appeared from three or four days to as many weeks after birth, has been intense in its degree, and associated with marked disturbance of respiration, and yet, under proper treatment, the infants have usually recovered. We believe that the cause of such cyanosis is to be found in atelectasis of the lungs, which acts partly by causing general venous congestion, and partly perhaps by obstructing the flow of blood through the pulmonary artery, so that the right cavities of the heart become distended, and there results an admixture of venous and arterial blood through the still unclosed foramen ovale.

Before attempting to explain the peculiar blue color in cases of true cyanosis, it will be convenient to allude to the various lesions which have been found present in such cases.

**Morbid Anatomy.**—The blood in cyanosis is dark, and contains an excess of carbonic acid; it has also lost to a great extent its coagulability. The only organs beside those of circulation which present lesions, with any constancy, are the lungs.

Dr. J. Lewis Smith (*Dis. of Infancy and Childhood*, 1869, pp. 578–599), who has studied this disease with great care, and collected all the cases of it upon record, finds the condition of the lungs recorded with more or less minuteness in 110 out of 191 cases. In 26 cases there was tuberculosis, either confined to the lungs, or chiefly exhibited in these organs; in 35 cases the lungs were of small size, either from compression by effusion in the pleural sacs or pericardium, or sometimes, apparently, from the persistence of the fœtal state over a greater or less portion of the organ. In 35 cases the lungs presented a dark color, owing either to atelectasis or to engorgement and congestion. In 9 there was emphysema in a part of the lungs; in 2, pneumonia; in 2, the color was pale; in 1 a bright crimson; in 1 the lungs were larger than natural; in 1 the right lung was absent, and in 17 these organs were recorded as healthy.

There is also found, in a large proportion of cases, venous congestion of the brain, liver, or kidneys. By far the most marked and important lesions, however, are those of the heart and great vessels, which are, excepting in extremely rare instances, the essential seat of the disease. The number of these lesions already recorded is considerable, as will be seen from the subjoined table borrowed from Smith, which shows their character and relative frequency.

| | |
|---|---|
| 1. Pulmonary artery absent, rudimentary, impervious, or partially obstructed, | 97 |
| 2. Right auriculo-ventricular orifice impervious or contracted, | 5 |
| 3. Orifice of the pulmonary artery and the right auriculo-ventricular aperture impervious or contracted, | 6 |
| 4. Right ventricle divided into two cavities by a supernumerary septum, | 11 |
| 5. One auricle and one ventricle, | 12 |
| 6. Two auricles and one ventricle, | 4 |
| 7. A single auriculo-ventricular opening; interauricular and interventricular septa incomplete, | 1 |
| 8. Mitral orifice closed or contracted, | 3 |
| 9. Aorta absent, rudimentary, impervious, or partially obstructed, | 3 |
| 10. Aortic and the left auriculo-ventricular orifices impervious or contracted, | 1 |
| 11. Aorta and pulmonary artery transposed, | 14 |
| 12. The cavæ entering the left auricle, | 1 |
| 13. Pulmonary veins opening into the right auricle, or into the cavæ or azygos veins, | 2 |
| 14. Aorta impervious or contracted above its point of union with the ductus arteriosus; pulmonary artery wholly or in part supplying blood to the descending aorta through the ductus arteriosus, | 2 |
| | 162 |

It is evident from a glance at this table, that the vast majority of the above lesions must occur before the full development of the heart is attained; and that consequently, in nearly every instance, cyanosis is a congenital affection. But further than this it will be observed, that in the first four groups in Smith's table, or in 119 out of 162 cases, the lesions affect the right side of the heart, and are precisely of the kind that we know are caused by inflammation of the endocardium. Bearing in mind then the well-ascertained law, that endocarditis occurring during fœtal life, almost exclusively attacks the right side of the heart, we can readily understand how such lesions could be produced by an attack of inflammation affecting either the valves of the pulmonary artery, or the tricuspid valves, or some part of the lining membrane of the right ventricle. Should such an attack of endocarditis occur after the development of the cavities and septa of the heart, and the closure of the foramen ovale and ductus arteriosus, and lead to occlusion of the orifice of the pulmonary artery, it would of course be impossible for life to be sustained. But where such a lesion is produced, while the interauricular and interventricular septa are still imperfect, and the ductus arteriosus patulous, so much compensation may be effected that life can often be prolonged for many years. Thus, it is evident, that the first effect of the closure of the orifice of the pulmonary artery, at such an early period, will be to cause a large portion of the blood from the right ventricle to pass directly through the opening remaining in the interventricular septum into the left ventricle. Usually this opening is not free enough to relieve the right ventricle entirely, and there is consequently pressure exerted backwards on the blood entering from the right auricle, which forces part of it through the foramen ovale into the left auricle, and thus still further relieves the fulness of the right cavities. As there is no outward current through the pulmonary artery, owing to the occlusion of its orifice, blood flows back into this vessel from the aorta through the patulous ductus arteriosus, and thus supplies the lungs. At the same time the bronchial arteries become much enlarged, and, in some rare cases, blood has been able to reach the lungs through abnormal branches from the internal mammary or intercostal arteries. In cases of cyanosis which prove fatal very soon after birth, the most diverse and inexplicable lesions, as above enumerated, may be found; but in those instances where life is prolonged, the heart is usually found to present the associated lesions above described: contraction or occlusion of the orifice of the pulmonary artery, imperfect interventricular septum, and patulous foramen ovale and ductus arteriosus. In such cases, when the compensatory communications between the right and left side of the circulation are free, life may be prolonged for many years.

This was very nearly the condition found in the following case,[1] the opportunity of examining and describing which we owe to the courtesy of Dr. C. H. Thomas.

"The patient was a young man, æt. 22 years, who had been markedly cyanotic from infancy, and was poorly developed. He was unable to maintain a proper temperature. He suffered constantly from slight dyspnœa, with occasional exacerbations. At the autopsy there was marked congestion of the abdominal viscera, and the gall-bladder was packed with gall-stones. Both lungs contained numerous yellow miliary tubercles.

"The heart was rounded. The cavities of the ventricles were not much enlarged, nor was there any hypertrophy of the walls of the left ventricle.

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[1] See Descriptive Catalogue of Path. Museum of Penna. Hosp., No. 1501, p. 84. by William Pepper, M.D. 1869.

The walls of the right ventricle were, however, decidedly thickened, though not equalling those of the left. The septum ventriculorum was disproportionably thick, and terminated about one-third of an inch below the level of the origin of the aorta in a smooth, rounded edge, over which the endocardium was thickened. The septum also seemed inside of its normal position, so as almost to bisect the aortic orifice. The aorta, which was slightly dilated but quite healthy, thus communicated freely with both ventricles. The origin of the pulmonary artery was very much obstructed, owing to coalescence and contraction of its valves. The ductus arteriosus was, unfortunately, not preserved, but, owing to the large size of the pulmonary artery beyond the seat of obstruction, it had in all probability remained patulous. The foramen ovale was closed."

In this instance, the orifice of the pulmonary artery not being entirely closed, the opening in the interventricular septum had been large enough to allow the right ventricle to relieve itself in that way, and consequently the foramen ovale had closed.

The mere persistence of the foramen ovale can scarcely be regarded as a cause of permanent cyanosis. It is quite possible that during the early days of extra-uterine life, a certain amount of cyanosis might exist owing to the admixture of venous and arterial blood allowed by this opening, but after the forces of the circulation become equalized, it is quite certain that the valve of the foramen may remain unattached, or may even be somewhat insufficient to close the opening, and yet no cyanosis be present.

As an illustrative case of one of the rarer forms of cyanosis, and one which bears in the most interesting manner upon the theory of its production, we abstract the following from a more full account published in the *Proceedings of the Pathological Society of Philadelphia*.[1]

The child was a well-developed male, born at full term. No discoloration was noticed at birth, but on the twelfth day, as the grandmother was preparing to wash it, it had a convulsion, and from that time presented coldness of the extremities, gradually increasing lividity, feeble and rapid pulse, and moaning and sighing respiration.

During inspiration, the sternum and upper parts of the chest were elevated, but the lateral regions remained unexpanded, and there was marked recession of the base of the thorax. The percussion-resonance was diminished on both sides, but especially on the right. The vesicular murmur was puerile, except over the right side, where it was feeble. The cardiac sounds were decidedly louder at the right scapula than over the left. The cardiac impulse at the left nipple was very indistinct, and the sounds there feeble but natural. On pressing two fingers lightly to the left of the ensiform cartilage, close to the costal cartilages, a very distinct and quite vigorous impulse could be felt, one much more distinct than at the nipple. At this point a distinct blowing sound attended the systole of the heart. The diagnosis made at the time was: atelectasis of both lungs, of the right greater than of the left; dilatation with hypertrophy of the right ventricle; obstruction of the pulmonary artery, and open foramen ovale. Death occurred on the forty-fourth day after birth.

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[1] Transposition of the Arteries. Dr. J. F. Meigs. Proc. of Path. Soc., vol. ii, p. 37; and Am. Jour. of Med. Sciences, vol. xi, 1860, p. 415.

At the autopsy, the body was very small and thin. The thorax was flattened laterally, and contracted at the base. There was marked collapse of the lower lobes of both lungs, and especially of the right. The heart was one-half too large, and full, rounded, and distended with soft black clots. The walls of the right ventricle were very thick, and its cavity quite small: it presented the appearance we usually associate with the left ventricle. The walls of the left ventricle were thinner than those of the right; and its cavity was much more capacious than that of the right. The right auricle was dilated and considerably larger than the left. The foramen ovale presented an opening at its lower aspect of about 2 or 3 lines in diameter. The orifices of the venæ cavæ appeared smaller than usual.

The aorta and pulmonary artery were transposed. The aorta arose from the right ventricle in the usual position of the pulmonary artery: the pulmonary artery arose from the left ventricle, and passing under the arch of the aorta, gave to the latter, just beyond the left subclavian, the ductus arteriosus, which was quite pervious and of considerable size. The valves of the heart were healthy and not transposed. The pulmonary artery was of the natural size; and presented no obstruction at its point of origin. After giving off to the aorta the ductus arteriosus, it divided as usual into two pulmonary branches, which soon subdivided into others.

The aorta was of full size and presented nothing unusual. It gave off at its arch the innominate artery, and then the left primitive carotid and the left subclavian. Just beyond the latter it received, from the pulmonary artery, the ductus arteriosus.

The pericardium was normal in all respects.

*Theories as to the Production of Cyanosis.*—In the vast majority of cases the malformation which causes cyanosis is of such a character as to allow admixture of the venous and arterial blood, and, at the same time, to interfere more or less with the circulation of this mixed fluid. Ever since the time of Morgagni, authors upon this subject have been divided in opinion as to whether the coloration of the skin were due exclusively to one or the other of these causes; obstruction to the cardiac circulation and consequent venous congestion, or intermingling of the venous and arterial blood.

In regard to the first of these causes, although it has numbered among its advocates Morgagni, Louis, and Stillé, it cannot be considered competent to fully explain all the cases and peculiarities of cyanosis, although such central obstruction will unquestionably aid in its production.

Nor can the second theory be held exclusively sufficient, since not only are there cases met with where cyanosis is present and yet no admixture of venous and arterial blood is possible, but also, on the other hand, where a considerable degree of admixture exists without the production of cyanosis.

It seems necessary therefore, as Smith has clearly pointed out, that any theory which pretends to embrace all the elements of this complex condition, should embody a reference to the fact that the essential defect in cyanosis is a want of arterialization of the blood.

SYMPTOMS.—Even in cases where cyanosis is due to congenital organic lesions, the peculiar symptoms are not always present until some time after birth.

Thus, in 138 of the cases of cyanosis collected by Smith, the time at which lividity was first noticed is stated as follows:

In 97 it was within the first week, and often within a few hours after birth.

In 3 at 2 weeks.
" 1 " 3 "
" 2 " 1 month.
" 7 from 1 to 2 months.
" 5 " 2 " 6 "
" 5 " 6 " 12 "
" 3 " 1 " 2 years.

In 6 from 2 to 5 years.
" 1 " 5 " 10 "
" 6 " 10 " 20 "
" 1 " 20 " 40 "
" 1 over 40 years.
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41

Dr. Smith adds, "that in these 41 cases, in which blueness did not occur till after the age of one week, if the patient were less than two years old when it commenced, there was frequently no obvious exciting cause; but above this age, with three exceptions, such a cause is known to have been present. It is interesting to observe how trivial the exciting cause frequently is" (an acute attack of sickness, an attack of convulsions, difficult parturition, a fall, or even a severe blow), "and equally interesting to note how long patients have enjoyed good health, not having the least lividity, although the anatomical vice, to which the final development of cyanosis was due, had existed from birth."

The most characteristic symptom of cyanosis is the lividity of the surface, which varies in different cases from mere duskiness to a deep purplish tint. This color also varies in degree in different parts of the body, being most marked in the distant and especially the dependent portions, upon the mucous membranes, and wherever the capillary vessels are abundant, as on the face. Its degree varies, finally, in the same case with the condition of the circulation. In slight cases, where the patient is quiet and the circulation tranquil, the discoloration of the surface may be imperceptible, but upon any exertion, and especially in the more severe cases, the lividity becomes much intensified. In some instances, such as that narrated by us below, there may be actual ecchymoses of the surface, as in purpura.

The state of the general nutrition is much impaired, and the subjects of this disease are usually stunted and illy-developed. In many instances the generative system appears even more imperfectly developed than the rest of the economy. The temperature of the body is [illegible] [illegible], and exposure to cold is very poorly borne.

In a good many cases the thorax presents the [illegible] [illegible] in association with rickets, known as the "pigeon-breast." [illegible] usually

During the paroxysms of palpitation and dyspnœa, the best remedies are diffusible stimulants, such as Hoffman's anodyne, spirit of chloroform, ammonia, and brandy; and derivatives, such as sinapisms to the chest or hot mustard foot-baths. In cases where the digestion is markedly feeble, the use of vegetable tonics is indicated.

By far the most important part of the treatment however, is a strict attention to the hygienic conditions of the patient. He should, so far as may be practicable, avoid all excitement and active exertion; his diet should be digestible and nutritious, his clothing should be warm, and, in addition, he should carefully avoid all exposure to severe cold.

In cases where the venous congestion of the legs is marked and attended with œdema or with enlargement of the veins, laced stockings should be worn.

It occasionally happens that cyanotic patients find that certain positions afford them peculiar ease and comfort. Believing that in cases where the lividity appeared soon after birth (cyanosis neonatorum), it was due to a patulous condition of the foramen ovale, the late Dr. Charles D. Meigs was led to recommend (*Diseases of Children*, 1850, p. 92), that such children should be placed upon a pillow, on the right side, the head and trunk being inclined upwards about 30° or 45°. The object of this position was "to bring the septum of the auricles into a horizontal position, so that the blood in the left auricle might press the valve of Botalli down upon the foramen ovale."

In a certain number of cases the adoption of this recommendation has undoubtedly seemed to relieve the lividity, so that it is perhaps desirable that all cyanotic infants should be placed in this position; though from a glance at the anomalies in the formation of the heart which frequently attend cyanosis, it is evident that in most cases it could furnish no material relief. We are ourselves inclined to attribute the relief afforded by this position, not to any influence upon the foramen ovale, but to the fact that the heart's action is far most free and unincumbered when the child is placed upon the right side, with the trunk somewhat elevated.

## ARTICLE II.

### DISEASES OF THE HEART.

As we are prevented, by the limits of this work, from giving any detailed account of many of the affections which merely occur in childhood in common with adult life, we propose in this article to offer only a few practical remarks upon the differences presented by diseases of the heart occurring at these two periods of life.

Apart from those congenital malformations of the heart, already discussed in the preceding article, the diseases of this organ most frequently met with in childhood, are pericarditis, and acute and chronic endocarditis, with valvular disease.

The most frequent causes of these affections are rheumatism, the peculiar alterations of the blood present in scarlatina, rubeola, and diphtheria, and extension of inflammation from the adjacent tissues, in cases of pleurisy or pneumonia. Of these well-recognized causes, rheumatism is by far the most frequent; for, although young children are comparatively rarely the subjects of this disease, it is followed by some cardiac complication in a larger proportion of cases in childhood than in after years. This fact will be more fully referred to in our remarks upon rheumatism, where we dwell upon the importance of recognizing this marked tendency, and of watching most critically for the appearance of any symptom indicating that the heart has become involved. This extreme watchfulness is the more necessary, because it frequently happens in young children, that for several days before the development of any local articular trouble, there may exist marked rheumatic fever, with serious inflammation of the membranes of the heart.

In a few instances an acute cardiac affection cannot be traced to any of the causes above-mentioned, but appears to occur idiopathically, without exposure to any recognizable exciting cause.

So, too, in some cases of chronic valvular disease, and especially, it has seemed to us, of contraction and thickening of the mitral valve, the lesion cannot even be traced to any acute attack of endocarditis, but seems more akin to a fibroid degeneration, whose cause and early symptoms have been obscure and entirely overlooked.

Possibly, in some of these interesting cases, the real starting-point of the disease may have been an attack of endocarditis in fœtal life, which partially spoiled the valve, and set on foot degenerative changes, which slowly increased until they produced fatal symptoms.

*Acute Pericarditis* may occur at any period after birth. In very young infants it has been observed in conjunction with peritonitis, and was apparently due to erysipelas; while in other cases no cause could be assigned for its occurrence. The symptoms are, however, so vague and difficult to appreciate at this tender age, that the lesion is rarely recognized until after death. The infant is evidently in pain: the features are pinched and shrunken, the skin hot at first, and the pulse and respiration greatly accelerated. The physical signs can, however, rarely be satisfactorily determined, partly because death usually occurs before the lesions reach any considerable degree of development.

In older children the physical signs are often obscured by the coexistence of some inflammatory condition of the lungs or pleura, and the existence of pericarditis can only be surmised by the presence of a degree of disturbance of the circulation and respiration out of all proportion to the amount of lung trouble.

When, however, pericarditis occurs without any such complication, it may be often recognized by the seat of pain, the existence of great dyspnœa, amounting at times to orthopnœa; the great frequency of the pulse, which is often small, and even irregular; the [illegible] of the [illegible] as shown by lividity of the lips and [illegible] percussion, which reveal at first merely a [illegible]

We will conclude this brief sketch by giving a few cases, selected from those occurring in our practice, which will serve to illustrate the points to which attention has been especially directed.

Case 1. *Acute pericarditis.*—M. M., a girl, æt. 3 years, was seen in consultation, suffering with what was supposed to be an attack of pneumonia. Death occurred soon, and there was found to be extensive acute pericarditis, with effusion of serum and lymph.

Case 2. *Fatal acute endocarditis.*—O. M., a girl, between 4 and 5 years old, was seized with a violent attack of illness, attended with fever, cough, dyspnœa, and a loud and rough systolic murmur at apex. Death occurred at the end of four weeks, and at the autopsy, marked inflammation of the mitral valves was found with abundant fringe-like vegetations on the leaflets.

Case 3. *Mitral contraction of obscure origin.*—C., a girl, æt. 5 years, apparently in excellent health, and with no history of any acute illness. We detected by accident a loud, high-pitched, systolic murmur at the apex. Her parents removed from this city to New Haven where, five years later, she died suddenly. The mitral orifice was found much contracted and the left ventricle hypertrophied.

Case 4. *Acute rheumatic endocarditis; improvement, but persistent murmur.*—A. N., a girl, at age of 9½ years, had a violent attack of acute articular rheumatism with endocarditis. This was followed by a double murmur at aortic orifice, which continues to the present time, though she has grown up, married and has one child. Her health is delicate, and she has very moderate dyspnœa on exertion.

Case 5. *Repeated attacks of chorea; chronic valvular disease.*—A. C., a girl, at age of 8 years, had a very violent attack of chorea without any cardiac symptoms. At the age of 11 years, she had a second attack, during which there was developed a loud, rough and prolonged systolic murmur at the apex, which still persists at the age of 12 years. Her health is now quite good, though her face is pallid, the cardiac impulse strong, and she is somewhat short-breathed on exertion.

Case 6. *Acute articular rheumatism; endocarditis; recovery; murmur persistent but diminishing.*—H. S., a boy, æt. 12 years, had a severe attack of acute articular rheumatism in April, 1869, with swelling, redness, and pain of joints; a systolic murmur appeared at the apex without any pericarditis. He recovered, under the use of alkalies and opium. In November, 1869, seven months after the attack, he seems perfectly well; has no dyspnœa except on violent exertion. The murmur at the apex is still audible, but less marked than three months ago when he was last examined.

Case 7. *Repeated attacks of chorea; chronic valvular disease.*—G., a girl, had chorea twice, at the age of 8 and 12 years. During this last attack a diastolic aortic murmur was detected, which is still present at the age of 17 years. Her health is delicate; she is pale and weak, and suffers from dyspnœa on exertion.

Case 8. *Acute rheumatic endocarditis; persistent murmur.*—M. N., a girl, at the age of 10 years, had a violent, long-continued attack of articular rheumatism, during which a regurgitant aortic murmur appeared, which is still persistent at the age of 17 years, though her general health is very good, and she has no dyspnœa on ordinary exertion.

CASE 9. *Acute endocarditis (rheumatic?); marked improvement in general symptoms, but persistent murmur.*—B. H., a girl, at age of 4 years suffered from an ordinary catarrh, when we detected a loud, high-pitched murmur at the apex, and on inquiry, learned that, when 2½ years old, she had a violent inflammation of the chest, supposed to be catarrhal fever. At present, at the age of 12 years, she is in excellent health, without any of the rational signs of cardiac trouble, but she still has a well-marked, rather prolonged, high-pitched, systolic murmur at the apex.

CASE 10. *Repeated attacks of rheumatism with severe mitral disease; improvement in general symptoms and force of the murmur.*—L. S., a girl, was subject to attacks of rheumatism from very early age, and has presented symptoms of cardiac disease from infancy. At age of 13, there was a strong systolic murmur heard over base and toward apex. She suffered much from violent palpitation, pain in præcordia, headache, and habitual dyspnœa, much increased on exertion. At age of 18, there is still a systolic mitral murmur, but of much less intensity than formerly. Her general health is excellent, and she has but little dyspnœa or palpitation at any time. The heart's action is still readily excited; the impulse strong, but without thrill; there is marked increase in the area of cardiac dulness, but no positive prominence of the præcordia.

CASE 11. *Acute rheumatic endocarditis, chronic mitral disease; recovery in five years.*—F. R., a girl, at the age of 6 years, was attacked with slight rheumatic fever, without any articular symptoms. In a few days, a distinct but not loud, rather low-pitched systolic murmur was heard at the apex. The treatment consisted of rest in bed, quinia, and Dover's powders. After ten days, all the acute symptoms disappeared, but the murmur continued. She regained her health, but for two years the murmur could be detected, but then gradually diminished; and now, five years after first attack, no murmur can be detected, the first sound at the apex being merely a little prolonged. Her general health is excellent.

CASE 12. *Acute rheumatic endocarditis; valvular disease, gradually recovering in course of two years.*—M. B., a girl, at the age of 7 years had fever of a type that made us suspect pneumonia or pleurisy, but without cough, pain in the chest, or any of the physical signs of pulmonary disease. On the third day, there was complaint of pain in one groin, but with no other articular symptoms; rheumatism being suspected, a careful examination detected a roughish systolic murmur at the apex. She was leeched at the præcordia, confined strictly to bed, and had Dover's powders given her. The fever subsided, but the murmur continued for two years, gradually growing faint and finally disappeared.

The effect of exposure and exertion in inducing a fatal result in cases which otherwise might have gradually improved, is well shown in the following instance.

CASE 13. *Repeated attacks of acute rheumatism in early childhood:*

*valvular disease and hypertrophy; gradual improvement; exposure to hardships of army life; rapid aggravation of symptoms and death.*—W. D., male, as a young child suffered from repeated attacks of acute articular rheumatism with cardiac complication. At the age of 9, Dr. Gerhard pronounced him to be suffering from valvular disease and hypertrophy of the heart.

His condition was gradually improving, and he had so few symptoms of cardiac disease that, at the age of 18 years, he was able to enter the infantry service. At the end of one year, however, he was discharged for disability, and when seen by us in July, 1864, presented the following symptoms: bulging of præcordia; marked extension of the cardiac impulse, which was heaving and powerful; marked increase in the area of cardiac dulness from the presence of pericardial effusion; and strong systolic mitral murmur. He had lost flesh; the surface was sallow and lips livid; there was frequent cough with occasional hæmoptysis and epistaxis; the liver was enlarged, and there was frequently œdema of the feet.

Towards the close of the year, the heart's action grew more labored and feeble, the pulse thready and frequent, the entire body became anasarcous, and considerable ascites appeared. He suffered from constant orthopnœa and frequent cough, with bloody expectoration. The skin of the legs subsequently became gangrenous in parts, and he died December 28th.

At the autopsy, the heart was found enormously enlarged, extending over to the right of the sternum. The pericardium was firmly adherent throughout its extent, and in places was ¼ inch thick; there were several cartilaginoid plates in the substance of the investing pericardium.

The heart measured 9½ inches from apex to base, and 6 inches across at the base of the ventricles; the walls of the left ventricle were 1½ inches thick; the auricles were enormously dilated with very thin walls. The aortic and pulmonary valves were healthy and apparently sufficient: the tricuspid valves were also healthy, but probably insufficient. The mitral valves had entirely disappeared, from shrivelling and contraction, and there merely remained a very thick fibrous ring, studded with calcareous masses, bounding the auriculo-ventricular opening.

The muscular tissue of the heart presented an incipient stage of fatty degeneration.

The liver was enormously enlarged, reaching nearly to the umbilicus, and presented intense nutmeg congestion.

The kidneys were large and congested, and the spleen three times its normal size.

# CLASS III.

## DISEASES OF THE DIGESTIVE ORGANS.

## CHAPTER I.

### DISEASES OF THE MOUTH AND THROAT.

We find ourselves much embarrassed as to what classification of the diseases of the mouth is the most proper to adopt. So much confusion reigns amongst authors as to the nature of these affections, and consequently as to their nomenclature, that it is very difficult to reconcile the various discrepancies which exist. After much consideration, however, we believe that the following arrangement is the one best suited to the existing state of knowledge upon these affections:

1. Simple or erythematous stomatitis.
2. Follicular stomatitis, or aphthæ.
3. Ulcerative, or ulcero-membranous stomatitis.
4. Gangrene of the mouth.
5. Thrush, or stomatitis with curd-like exudation.
6. Simple, or erythematous pharyngitis.

It will be observed that the only disease of the throat of which we treat is simple or erythematous pharyngitis. In the previous editions of this work, we also described pseudo-membranous pharyngitis in this place, but further observation and research have clearly established the fact that this is but the local manifestation of a constitutional affection, diphtheria; and we have accordingly given a full account of the whole subject, under this latter name, in the section on constitutional diseases.

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## ARTICLE I.

### SIMPLE OR ERYTHEMATOUS STOMATITIS.

**Definition; Frequency.**—This form of stomatitis consists of simple diffuse inflammation of the mucous membrane of the mouth, unattended by vesicular or pustular productions, by ulcerations, or by membranous exudation. It is a disease of infrequent occurrence, except in the forming stage of other kinds of stomatitis, and of little importance, seldom requiring the attention of the physician.

The *causes* of the disease are the introduction of irritating substances, such as hot drinks, and acrid or caustic preparations, into the mouth; difficult dentition; and probably sympathy with disordered states of the stomach. It occurs not unfrequently as a secondary affection, particularly in the course of measles, scarlet fever, and small-pox.

The *symptoms* of erythematous stomatitis are more or less vivid redness of the mucous membrane, sometimes diffused, and at others punctuated or disposed in patches; slight swelling of the same tissue; heat; and tenderness to the touch, and also in the act of sucking or eating. The child is generally fretful and restless, and either loses its appetite, or refuses to nurse or take food freely, on account of the tenderness of the mouth. There are seldom any general symptoms except in secondary cases, in which they are those of the primary affection.

The *treatment* is very simple. It consists in the use of some demulcent wash, as gum-water, sassafras-pith mucilage, a little honey put on the tongue occasionally, and if the inflammation be at all considerable, in the application of some astringent preparation. This may consist of honey and borax, two or three parts of the former to one of the latter, or of the following wash, recommended by M. Bouchut:

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| ℞.—Mel. Rosæ, . . . . . . . | f℥j. |
| Aluminis, . . . . . . . | ʒss. |
| Aquæ distillat., . . . . . | f℥ss.—M. |

The application of any of the washes recommended is best made by means of a thick and soft camel's-hair pencil; or it may be done with a soft rag, which should be dipped in the wash, and then conveyed into the mouth on the point of the finger. The remedy ought to be used several times a day.

If signs of gastric or intestinal disorder are present, they should be attended to.

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## ARTICLE II.

### APHTHÆ.

**Definition; Synonymes; Frequency; Forms.**—The term aphthæ ought to be restricted to the vesicular and ulcerous form of disease of the buccal mucous membrane, in which that tissue is covered with an eruption of vesicles which break, and are followed by small rounded ulcerations. Under this title writers formerly confounded the affection we are now considering with ulcerative stomatitis and thrush. It is called by Billard follicular stomatitis, and by several other writers vesicular stomatitis.

The *frequency* of the disease is very considerable. We shall describe two *forms*, the *discrete* and *confluent.*

CAUSES.—The only causes which seem to have been ascertained with any degree of certainty are early age and the process of dentition; the contact of irritating substances, particularly stimulating and acrid articles of food, with the mucous membrane of the mouth; and the existence of some morbid irritation of the digestive tube, especially of the stomach. The confluent form is often connected with severe general disease of the constitution.

SYMPTOMS; DURATION.—Aphthæ begin in the form of small red elevations, having little white points upon their centres, which consist of the epithelium of the mucous membrane raised into vesicles. The vesicles are small in size, oval or roundish in shape, and of a white or pearl color. They soon break and allow the fluid which they contained to escape, after which there remains a little rounded ulcer, with excavated and more or less thickened edges, and surrounded almost always by a red circle of inflammation. The bottom of the ulcers is usually of a grayish color.[1] There is seldom any diffuse inflammation of the mucous membrane in this disease. The *number* of aphthæ varies in the two forms. In the discrete variety there are but few, whilst in the confluent form they are of course much more numerous. They generally appear first on the internal surfaces of the lips and gums, and then on the inside of the cheeks, edges of the tongue, and soft palate.

The discrete form is generally accompanied by symptoms of slight disorder of the digestive organs, consisting of thirst, acid eructations or vomiting, imperfect digestion, and a little constipation or diarrhœa. The confluent form, which is much more rare, especially in very young infants, usually coincides, as has already been stated, with severe general or local disease.

The *duration* of aphthæ is different in the two varieties of the affection. The discrete form generally pursues a rapid progress, lasting, usually, from the beginning to the time of cicatrization, between four and seven days. Sometimes, however, when the vesicles are formed successively, one after the other, the disease lasts much longer. The confluent variety pursues a much slower progress, and is much more difficult of cure.

DIAGNOSIS AND PROGNOSIS.—The diagnosis of discrete aphthæ is not at all difficult, in consequence of their being isolated and succeeded by small and limited ulcerations. The confluent form, on the contrary, may be confounded with ulcerative or ulcero-membranous stomatitis, and with thrush. From the first-mentioned disease it may be distinguished, however, by attention to the circumstances that that affection begins by small white patches, and not by pustules, as do aphthæ; that the ulcerations which follow the patches are covered with true pseudo-membrane; and that the white patches just spoken of appear first upon the gums, whilst aphthæ generally begin upon the posterior surface of the inferior lip, and upon the tongue. From thrush it is to be distinguished by the facts that that disease commences by white points, which are not pustular, and which, running together, form a creamy exudation; by the absence or very small number of ulcerations; and by the presence of the peculiar fungus of thrush.

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[1] The grayish or yellowish-gray secretion, on the base of the aphthous ulcers, has lately been closely studied by Dr. J. Worms (Glasgow Med. Jour., July, 1864), who states that both microscopical examination and chemical tests invariably show its sebaceous nature. It is his opinion, therefore, that aphthæ are the acne of the mucous membranes; in support of which, it will be remembered, that they are found most frequently where the muciparous glands are most abundant.

Discrete aphthæ constitutes a very mild disorder. They always recover without much difficulty. The confluent disease is more serious, because its progress is much slower, its cure more difficult, and because it is often connected, as has been stated, with some other severe disease.

TREATMENT.—Aphthæ, particularly the discrete variety, require in general, very simple treatment. The means to be employed are *general* and *topical*.

The *discrete variety* usually requires only topical remedies, regulation of the diet, and when there are marked symptoms of gastric derangement, the exhibition of some mild emetic, or of a laxative dose. The *local treatment* should consist of applications of demulcent preparations, as the mucilages of slippery elm, sassafras pith, flaxseed, marsh-mallow root, quince seed, &c., which are to be used pure when there is no pain, or with the addition of a few drops of laudanum or wine of opium, when the mouth is sore and tender; the aphthæ ought to be touched occasionally with the mixture of borax and honey, or the aluminous preparation recommended for simple stomatitis. The applications must be made several times a day with a camel's-hair pencil, a pencil made of charpie or cotton, or with a soft rag covering the finger. When the ulcers which follow the vesicles fail to cicatrize rapidly under the above applications, or when they are numerous and painful, their cure may be very much hastened and the pain quickly relieved, by touching them lightly with a stick of nitrate of silver, or a piece of alum, sharpened to a point; or we may employ a pencil dipped into a strong solution of nitrate of silver, or into a mixture of one part of muriatic acid to two of honey. Ether has been highly recommended as a local application by Dr. J. Worms who, as already stated, has observed the fatty nature of the deposit in aphthous ulcers.

The *general treatment* of discrete aphthæ need consist of nothing more than the prescription of a simple, unirritating diet in most of the cases. If, however, the digestive apparatus is deranged, the case must be treated according to the symptoms; by antacids or a gentle emetic, when the tongue is foul and the secretions acid, and by the use of a mild laxative, as castor oil, magnesia, or rhubarb, when there is constipation. When diarrhœa is present, we should resort first to a small dose of castor oil or syrup of rhubarb, with the addition of half a drop to two drops of laudanum, according to the age of the child, and afterwards to astringents and opiates, as will be recommended in the article on simple diarrhœa.

The treatment of *confluent aphthæ* must depend on their cause. The local treatment is the same as that for the discrete variety, except that cauterization should be resorted to at an earlier period. When they seem to depend upon a general morbid condition of the constitution, as congenital debility, a scorbutic diathesis, or upon chronic affections of the digestive organs, they must be treated in the first place by properly regulated and nutritious diet, and by the exhibition of tonics and gentle stimulants, particularly iron, quinine, and small quantities of very fine old brandy; and in the second case, in the manner which will be recommended for chronic derangements of the stomach and bowels, when we come to treat of the diseases of those organs.

## ARTICLE III.

### ULCERATIVE OR ULCERO-MEMBRANOUS STOMATITIS.

Definition; Synonymes; Frequency.—This form of sore mouth is characterized by a secretion upon the mucous membrane of a plastic exudation in thick, yellowish, adherent patches, and by inflammation, erosion, or ulceration of the subjacent tissues. It is the same disease as the aphtha gangrenosa, and, we believe, the cancrum oris also of Underwood; the ulceration of the mouth of Dewees and Eberle; the stomatite couenneuse, and the ulcerative and pseudo-membranous forms of the stomatite gangreneuse of M. Valleix; the stomatite pseudo-membraneuse or diphtheritique of some writers; and the stomatite ulcero-membraneuse of MM. Rilliet and Barthez. It is the disease described under the title of gangrenous sore mouth by Dr. B. H. Coates (*North American Surgical and Medical Journal*, vol. ii, 1826), with the exception of a few cases which were what we shall treat of as gangrene of the mouth.

Of the different titles given above, we prefer that of ulcero-membranous stomatitis, as most expressive of the distinctive features of the disease. This form of stomatitis is not very *frequent* in private practice, but sometimes prevails extensively in hospitals, and other public institutions for children, where it often assumes an epidemic character.

Causes.—The *predisposing causes* are epidemic influence, of the existence of which we believe there is no doubt; according to some observers, contagion, which, however, has not as yet been positively shown; and bad hygienic conditions as to cleanliness, ventilation, food, clothing, and habitation. That it is epidemic, we have no doubt from our own experience, since we are rarely called to a case without soon meeting with others, while we sometimes pass several months without seeing a single example of the disease. We have also known it to be endemic in a household, having on one occasion met with seven cases in two families of children residing under one roof, on two other occasions with three cases, and on several others with two. It is most frequent between the ages of five and ten years, though it may attack all ages, and is more common in boys than girls. It occurs during the convalescence from severe diseases, as pneumonia, the eruptive fevers, typhoid fever, entero-colitis, and other affections of children.

The *exciting causes* of sporadic cases are unknown, with the exception, perhaps, of the presence of a carious tooth in the mouth, and fracture or necrosis of the maxillary bones.

SYMPTOMS; COURSE; DURATION.—The disease begins with slight pain and uneasy sensations in the gums, which then become swelled, red, bleeding when touched, and are soon after covered with a grayish, pultaceous exudation of varying thickness. The exudation extends from the gums to the internal surface of the lips and cheeks, and sometimes, but more rarely, to the soft palate, and even to the pharynx and nasal passages. The plastic deposit occurs in the form of small, and slightly projecting, yellowish patches, which approach each other, unite, and form bands of pseudo-membrane, somewhat uneven upon the surface, and adhering with considerable force to the tissue beneath. When the exudation is detached, the mucous membrane is found to be of a red or purple color, bleeding, and excoriated or ulcerated. The ulcerations which exist under the false membrane are of various depths, of a grayish, livid, or blackish color, with swelled, softened, and livid red, or bleeding edges. Those which are formed upon the inside of the lips are rounded in shape, whilst those seated in the angle between the lips and gums, are usually elongated. In mild cases of this affection, the local symptoms, though perfectly characteristic, are less severe than those just now described. The ulcerations are often few in number, amounting to four, five, or six upon the tongue, to a few scattered over the inner surfaces of the lips, and to some upon the gums, and especially about the necks of the teeth. The other symptoms are the same as those above mentioned, with the exception that they are milder in degree.

When the disease is mild, and when it is properly treated, the false membranes become detached, leaving the mucous tissue merely excoriated, in which case it soon regains its natural condition; or else the ulcers which exist beneath rapidly become healthy and cicatrize. In violent cases and in those badly treated, the inflammation, on the contrary, persists; the pseudo-membranes increase in thickness, or if detached, are formed anew; the ulcerations become deeper; the disease extends; and the case lasts an indefinite period of time.

Other symptoms, besides those we have mentioned, characterize the disease.

The *breath* is always more or less fetid, and in bad cases, almost gangrenous. The *salivary* and *submaxillary* glands are generally more or less swelled, hard, and painful, and according to some authors, the surrounding cellular tissue is in the same condition, though this is denied by others. The *movements* of the lower jaw are stiff and painful in severe cases. *Deglutition* is not affected unless the disease extends to the pharynx. In violent cases there is usually a copious *discharge* of fetid, watery saliva, or of bloody serum, which flows from the mouth during sleep. When the ulcerations are deep and large, the tissues beneath are more or less swelled; the swelling, however, rarely assumes the hard, resisting, circumscribed characters, with the tense, smooth, hot, and shining appearance of the skin, which exists in true gangrene of the mouth. In most of the cases there is a moderate, but decided *febrile reaction*, especially at the invasion. This usually subsides or disappears after two or three days, though it sometimes increases if the disease becomes extensive.

The disease begins, as already stated, on the gums, and unless limited to these parts, as sometimes happens, extends to the lips and cheeks. In many of the cases it attacks only one side of the mouth, and this is more frequently the left than the right.

The *course* of the disease is usually rapid in epidemic cases, and in those which are properly treated. Where badly treated, on the contrary, it may last from one to several months, or terminate in gangrene of the mouth.

Diagnosis; Prognosis.—The *diagnosis* is, as a general rule, very easy, if proper attention be paid to the characteristic features of the disease. It has, as already stated, been very often confounded with gangrene of the mouth. The method of distinguishing between the two will be given in full in the article on that disease. From thrush it is to be distinguished in the manner which will be pointed out when that disease comes under consideration.

The *prognosis* is favorable in the great majority of the cases. Sporadic cases probably always terminate favorably. The epidemic disease, though rarely fatal, sometimes proves so from its extension to the pharynx and larynx, or from its termination in gangrene of the mouth. We have seen a large number of cases in private practice, and have never as yet known one to become gangrenous or to prove fatal. Of upwards of 120 cases of this kind, observed by Dr. Coates at the Philadelphia Children's Asylum, in a period of three months, all but one recovered (*loc. cit.*, p. 21). The cases which occur in the course of other diseases are not dangerous in themselves, but are so as being the sign of a great severity of the primary affection.

Treatment.—The treatment may be divided into *general*, and *local* or *topical*. The *general treatment* should consist in most of the cases in attention to the diet, which ought, in healthy and vigorous children, to be simple and unirritating, and in those who are weak and debilitated, nutritious and digestible. If the bowels are costive, or the child feverish and uncomfortable, a laxative dose may be given with advantage; or some simple diaphoretic, as nitre and water, or the neutral mixture, may be used through the day, and a warm foot-bath or an immersion bath given in the evening. When the constitution is feeble, and the child weak or anæmic, tonic remedies are indicated. The best is probably quinine, or one of the ferruginous preparations; or the compound infusion of gentian, with addition of Huxham's tincture of bark, may be resorted to. If the inflammation be severe, and accompanied with tumefaction and tenderness of the glands and some febrile reaction, it might be proper to apply a few leeches to the neck, though we have never found this to be necessary. The best internal remedy, however, and indeed the only one of any kind that is necessary in most cases, is the chlorate of potash, which possesses a stimulant and alterative action upon the mucous membranes. This is spoken of in the highest terms by Dr. West, of London, who regards it almost as a specific. We have used it now for many years past in a very large number of cases, and have seldom found it necessary to employ any other means, excepting some mild cathartic dose where the bowels have been constipated, and a wash of borax or alum in honey of roses, or borax in simple honey. The symptoms have begun to amend in every case in from three to four or five days, and recovery has taken place in about a week or a little more. The dose is from two to three grains every four hours for a child three years of age, and four and five grains for one of nine or ten years. Mr. Hutchinson (*Med. Times and Gaz.*, 1856) who believes also that this salt is almost a specific in this affection, recommends it in larger doses than the above, giving as much as five grains, thrice daily, to an infant of one year old. We have usually prescribed it in the dose of two grains four times a day, in a mixture of syrup of ginger and water, for children three or four years old.

Prior to the discovery of the efficacy of the chlorate of potash in this affection, the *local treatment* constituted the only effectual and reliable means of removing it, and the most violent and painful applications were thought necessary and were made use of. Strong solutions of nitrate of silver, and pure or diluted muriatic acid, were frequently employed in severe cases. Now, however, these caustic substances may probably be entirely dispensed with, except in cases that show a tendency to assume the form of gangrene of the mouth. In ordinary cases the only local applications that need be used, and these are not essential when the child resists very much, are demulcent washes to keep the mouth clean—to be employed in the manner recommended in the article on aphthæ, and some mild astringent wash. This may consist of borax and honey, or borax and sugar, in the proportion of two or three parts of the former to one of the latter, or, what is in my opinion preferable to either of these, of a drachm of borax rubbed up with an ounce of honey of roses.

Should the disease resist the treatment by the chlorate of potash and the simple washes just now recommended, we may employ the following combination, proposed by Dr. Dewees, and of which he says that it "has so far never failed us:"

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| ℞.—Sulph. Cupri, . . . . . . . | g x. |
| Pulv. Cinch. Opt., . . . . . . | ʒij. |
| Pulv. G. Arab., . . . . . . | ʒi. |
| Mel. Commun., . . . . . . | fʒij. |
| Aquæ Font., . . . . . . . | f℥iij.—M. et ft. sol. |

The ulcerations to be touched with the mixture twice a day, with the point of a camel's-hair pencil. Or, we may resort to the following one, recommended by Dr. Coates (*loc. cit.*), and of which he says, that he "settled down, after various trials, in the employment of the following:

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| ℞.—Sulph. Cupri, | ʒij. |
| Pulv. Cinchonæ, | ℥ss. |
| Aquæ, | f℥iv.—M. |

To be applied twice a day, very carefully, to the full extent of the ulcerations and excoriations."

MM. Rilliet and Barthez recommend very highly the plan pursued by M. Bouneau at the Children's Hospital. This is to cleanse the mouth first, and then to apply dry chloride of lime (calx chlorinata of the Pharmacopœia) to the diseased surfaces. The application is made by means of a piece of rolled paper, or a stiff pencil, which is to be moistened and then dipped into the powder so that some may adhere, or with the finger. The surfaces are to be gently rubbed with the powder, and after a few moments' contact, washed clean with pure water. This is to be done twice a day, until the ulcerations assume a clean, healthy appearance, after which the following mouth-wash is to be employed:

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| ℞.—Mucil. G. Acac., | f℥i. |
| Syrup Cort. Aurant., | f℥ss. |
| Calc. chlorinat., | ℈i.—M. |

The chief danger from the disease depends on the circumstance that it sometimes terminates in gangrene of the mouth, to be presently described. Any disposition to such a termination should be carefully watched, and the proper preventive means, consisting of local stimulating or caustic applications, with the internal use of stimulants and tonics, be at once resorted to.

## ARTICLE IV.

### GANGRENE OF THE MOUTH.

DEFINITION; SYNONYMES; FREQUENCY.—Gangrene of the mouth is an affection which occurs chiefly in children of debilitated constitution, and especially as a sequel of some of the eruptive fevers. It begins generally by ulceration of the mucous membrane of the cheek, which, after a longer or shorter time, runs into gangrene, and extends rapidly to the gums; after a few days, if the disease be not arrested, the central tissues of the cheek become thickened and indurated, an eschar forms upon the integument, and spreads in depth and width, until at last the cheek may be perforated, the whole side of the face and jaws destroyed, the teeth loosened, and the maxillary bones exposed and necrosed. It is known by a great variety of names; grangrænopsis, cancrum oris, gangræna oris, canker of the mouth, gangrenous erosion of the cheeks of Underwood;

necrosis infantilis, gangrenous stomatitis, &c. It is a *frequent* disease in the hospitals for children in Europe, and a not uncommon one in institutions of the same kind in this country. It sometimes prevails endemically in hospitals. It is a rare disease in private practice, and we have as yet met with but few cases, excepting in public institutions.

PREDISPOSING CAUSES.—The disease is nearly, but not exclusively confined to the period of childhood. It is most common between the ages of three and six years; is very rare, but does sometimes occur in infants; and is of nearly equal frequency probably in the two sexes. Unfavorable *hygienic conditions* constitute a strong predisposing cause. Children living in hospitals or any crowded institution; those whose parents are poor or in want, and whose constitutions have been greatly deteriorated by long illness, by the tubercular diathesis, or by acute diseases, are particularly apt to be attacked. It almost always follows upon some previous acute or chronic disease, particularly measles, or some other acute exantheme; pneumonia; entero-colitis; hooping-cough; long-continued malarious fevers, &c. MM. Guersant and Blache say (*Dict. de Méd.*, t. 28, p. 601), "The existence of some anterior disease is a necessary condition of gangrene of the mouth; we have never known it, nor has M. Baron, to occur as an idiopathic affection." It has been affirmed by some persons to be *contagious*, but this is exceedingly doubtful. The fact of its occurring sometimes in an endemic form has already been referred to. It has been known also to prevail as an epidemic.

The *exciting causes* can rarely be ascertained with any certainty. The only one which seems to have been proved to exist in some instances, is the exhibition of large doses of the mercurial preparations, and even this is questioned by some very good authorities.

ANATOMICAL LESIONS.—Upon examination after death, it is found that the *integument* surrounding the mortified spot soon runs into putrefaction. The lip or cheek in which the disease is seated is swelled, hardened, tense, and shining, of a purple or greenish color, and presents a deep, circumscribed engorgement. On the most prominent part of the swelling there often exists a rounded or oval, and distinctly limited eschar, of variable size, from a third of an inch to an inch or even more in diameter. In some instances the cutaneous slough is much larger, and extends irregularly to different parts of the face, to the chin, neck, eyelids, and even to the neighborhood of the ear, so as to occupy the whole of one side. Under these circumstances, the tumefaction is neither so considerable, nor so regular, as when the slough is smaller. The eschar is always black, and generally dry and parchment-like, and extends a third or two-thirds of a line in depth, or quite through the integument. The tissues beneath the skin are not generally implicated, though in some cases the eschar is detached, and there is a perforation of the cheek through which may be seen the alveolar processes.

The *mucous membrane* of the mouth is always affected with mortification. The disease may be limited, so as to exist in the form of an elongated ulceration, of a dark grayish color, situated in the fold where the mucous membrane is reflected from the cheek to the lower jaw; or, in a larger proportion of cases, it is seated on the internal surface of the cheek, opposite the interval between the alveolar processes. Sometimes the disease is much more extensive, and occupies all or a part of the internal surface of the cheek. In such instances the whole thickness of the mucous tissue is destroyed, and it presents upon its surface a blackish or brownish pultaceous slough, almost liquid in consistence, which may be scraped off with a scalpel, leaving beneath loose shreds of mucous membrane, without any trace of organization. The gums frequently participate in the disease, and are converted into shreds, or completely destroyed.

The *maxillary bones* are sometimes, in severe cases, when the disease has extended to the gums, exposed, blackened, and even necrosed. The *teeth* are very often uncovered and loosened, and not unfrequently some are lost. The *tissues* between the skin and mucous membrane are found either hardened and infiltrated, or sphacelated to a greater or less extent. In the least severe cases, the fatty cellular tissue and the muscular structure of the cheek are infiltrated with serum, but preserve their organization. When the disease is more aggravated, the gangrene extends to these tissues also, and always to those adjoining the mucous membrane first; so that the cellular structure beneath that membrane, and then the muscles, are infiltrated with a sanious fluid, and either in a state of sphacelus or tending thereto, whilst some of the adipose tissue beneath the skin is still merely infiltrated. In yet worse cases, the sloughs formed on the two surfaces of the cheek come into contact, and if their separation from the sound parts has taken place, a perforation is the consequence.

The condition of the *bloodvessels* in the midst of the diseased parts has been carefully examined by MM. Rilliet and Barthez. These authors state that when the tissues of the cheek are merely infiltrated, the vessels remain healthy, permeable, and their parietes are scarcely or very slightly thickened. When the vessels run along the edge of the slough, they are still permeable, but their walls are thickened, and begin to assume the appearances of the mortified tissues. Lastly, when they traverse the centre of the eschar, they can still be traced out, but their canals are found obliterated by coagula, in the whole extent of the mortified parts: or else the coagula occupy the vessels at their points of entrance into and exit from the slough, while between these points their walls are thickened, tend to assume the color and softness of the putrefied tissues, and their canals are filled with pultaceous gangrenous matter. The writers quoted do not suppose that the obliteration of the vessels is the cause of the sphacelus, since that change occurs only after the death of the surrounding tissues has already taken place.

The disease very rarely occurs on both sides of the mouth at once, though this does occasionally happen.

The *submaxillary glands* are nearly always in their natural condition, but in rare instances are softened and engorged.

Gangrene of the mouth never, or very rarely, indeed, exists without lesions of other organs. Of these the most frequent are acute pulmonary affections, and after them, acute or chronic diseases of the gastro-intestinal tube, and then malarious fevers, pleurisy, pneumothorax, peritonitis, and nephritis.

SYMPTOMS; COURSE; DURATION.—The following account of the symptoms of the disease is taken chiefly from the work of MM. Rilliet and Barthez. Gangrene of the mouth generally begins during the course or convalescence of some acute or chronic disease, by ulceration, aphthæ, or phlyctenæ of the mucous membrane, and, in rare instances, by œdema of the substance of the cheek. At the same time the face is pale, and usually continues so throughout the disease; the nostrils and eyelids are often incrusted, and the latter infiltrated or sunken, and surrounded by bluish circles; the lips are swelled and covered with scabs, or dry. The breath of the child is fetid from the beginning, and, as the disease progresses, becomes gangrenous. There is but little fever at first, unless the case be accompanied by some acute disease; the pulse is commonly frequent and small in the beginning, rising gradually from 80 or 90 to 100 or 120, and becoming insensible towards the end. In cases occurring in the course of other diseases, the pulse rises sometimes to 120 or 140, and is larger and fuller. The child is generally languid and quiet at first, or more rarely cross and peevish. The strength may be either lost entirely, merely diminished, or the patient may retain a sufficient amount of force to sit up and observe what is going on around, and even to leave the bed the day before death. Half the children observed by MM. Rilliet and Barthez, in whom this symptom was noted, sat up in bed until within a few days of the fatal termination. In most cases but little complaint is made of pain in the mouth, though in some it is said to be severe.

The ulceration already spoken of as forming the first symptom of the disease is generally of a grayish color, and resembles very closely that which exists in the ulcero-membranous form of stomatitis. It may be seated either on the gums, in the fold formed by the junction of the cheek or lip with the gum, or on the inside of the cheek, opposite the space between the alveolar processes. It may present a gangrenous appearance from the first day, or not until after two or three days; or lastly, it may pass through the stages characteristic of ulcerative stomatitis, and terminate in the affection under consideration. Dr. B. H. Coates (*loc. cit.*) describes, under the title of gangrenous sore mouth of children, the ulcero-membranous form of stomatitis, and a few cases of gangrene, and states that three or four children out of 120 affected with ulcerated gums "suffered small spots of mortification, and one, by the delay arising from the tardy report of a nurse, suffered necrosis in a portion of an alveolus."

The ulcerations just described assume the following appearances as the gangrenous nature of the malady develops itself. They become grayish, and then dark in color, bleed easily when touched, and are covered with pultaceous sloughs, exhaling a characteristic fetid odor. The gangrene extends to the neighboring parts, from the gum to the cheek, or from the cheek to the gum, and implicates at last the whole side of the mouth, or of the lower lip. At the same time the affected cheek or lip undergoes a circumscribed infiltration, which is at first rather soft, but becomes afterwards firmer, and forms at last a hard and rounded knot or tumor in the centre of the cheek, which is now tense, shining as though smeared with oil, and pale, or marbled with purple spots, while the slough on the inside is of a brownish color, more extended in size, and sometimes surrounded by a dark ring. The hard tumor of the cheek just described usually appears between the first and third days after the sphacelation of the mucous membrane, though in some instances not until a later period. It is formed, as stated in the account of the anatomical lesions, by engorgement of the cellular and adipose tissues. The child, at this stage, is still able to sit up in bed and take notice, or shows evident signs of weakness and depression; the face is swelled and destitute of expression on the affected side; a bloody or dark-colored saliva runs from the mouth, which is partially open; the appetite is not entirely lost in all cases, the patient still demanding and taking food; vomiting is rare, but diarrhœa is almost always present; the thirst is generally intense; the skin is warm and feverish, natural, or too cool, and almost always dry, the differences depending probably more upon the concomitant disease than upon the mouth-affection. The respiration is natural or altered according to the nature of the primary disease, which is, as already stated, in a large proportion of the cases, a pulmonary affection. The intelligence is generally undisturbed, though in some rare cases there is insomnia, delirium, or piercing cries.

If the disease continues to progress, as it almost always does when it has reached the stage we are describing, there appears in many, but not all the cases (8 of the 21 observed by MM. Rilliet and Barthez), a slough or eschar upon the most prominent and discolored part of the swelling of the integument of the cheek or lower lip. This generally makes its appearance between the third and sixth days of the disease, but in other cases, as early as the second, or not before the twelfth, or even later. The skin, at the point where the eschar is about to form, becomes purple, and then black; sometimes a phlyctæna makes its appearance, which is very soon converted into a small, dry, black slough. This, if not limited by a process of separation from the living tissues, becomes larger and larger by the extension of the sphacelation, until it may, as already stated, embrace the whole side of the face. In grave and fatal cases, the gangrene sometimes extends to all the tissues of the cheek, and meeting, at last, the disease which had commenced on the inside of the mouth, occasions a perforation, through which may be seen the teeth, alveolar processes, and the whole interior of the buccal cavity. In such instances as these, several of which we have seen in the Pennsylvania and Philadelphia Hospitals, the appearance presented by the child is, as may well be imagined, of the most pitiable kind. Even under these circumstances, however, with the cheek perforated, the edges of the opening irregular and covered with shreds of dead tissue, the gums destroyed, the teeth loosened, and the maxillary bones exposed, blackened, and perhaps necrosed, with a dark and fetid sanies flowing from the mouth or perforation, and a putrefactive smell infecting the air around, the child may retain, in some instances, its strength, so as to sit up in bed, ask for food, and drink with avidity. In other cases, on the contrary, the patient, at this stage, is exhausted to the last degree, and refuses both food and drink. During the closing stage of the disease there is generally profuse diarrhœa, rapid emaciation, dry skin, small, rapid pulse, and at last death in a state of utter prostration.

In favorable cases the recovery may take place in the early stage, before the integument becomes involved, and while the gangrene is limited to the mucous membrane, or at a later period, after the slough has separated. In the first instance the child generally recovers without deformity, though we saw one case in which necrosis of about an inch of the front of the inferior maxilla took place, without any loss of the soft parts. When the child recovers after the formation of the cutaneous slough, a very rare event, the gangrene ceases to extend, the eschar separates and is cast off, the edges of the opening assume the appearances of a healthy ulcer, and after a length of time, approach each other and cicatrize, leaving generally a large, uneven, discolored scar, like that of a burn, which remains through life a horrid deformity.

The *duration* of the disease varies according to its termination. When this is unfavorable, which happens in much the larger proportion of cases, death usually occurs about the end of the first, or in the course of the second week, though it has been known to occur at a later period. In favorable cases the duration is commonly longer, particularly if a cutaneous eschar has been produced, as the separation of the slough and cicatrization of the ulcer which remains, require a tedious and slow process on the part of nature.

*Complications* are very apt to arise in the course of the disease. The most frequent is pneumonia. MM. Guersant and Blache state that it exists in nine-tenths of the cases; MM. Rilliet and Barthez found it in 19 out of 21; of the 19, it began in 8 during the progress of the gangrene, and apparently under the influence of the latter, whilst in the remaining cases it existed before, and acted perhaps as a predisposing cause to the affection of the mouth. Another and more dangerous complication is the occurrence of gangrene in other parts of the body, particularly the soft palate, pharynx, œsophagus, anus, and more frequently the vulva and lungs.

Diagnosis.—Some authors have described as identical affections, under the title of gangrenous stomatitis, the disease under consideration, and the one already treated of as ulcero-membranous stomatitis. This has been done particularly by M. Taupin, who is followed in his description by M. Valleix (*Guide du Méd. Prat.*, t. iv). It seems clear to us, moreover, that Dr. B. H. Coates, in his very valuable paper on the "gangrenous sore mouth of children" (*loc. cit.*), mingles in his description the two diseases referred to. We cannot but think, however, that the differences between them as to frequency, symptoms, course, amenability to treatment, and termination, which are fully pointed out in the diagnostic table below, and lastly the example of almost all authors upon this subject, fully warrant us in regarding them as different and distinct diseases.

The diagnosis of gangrene of the mouth is, in most cases, very easy. The ulceration of the mucous membrane, followed by gangrene; the deep-seated induration of the cheek, at first pale on the outside, then dark-colored, and terminating after a time in a characteristic slough; the course of the malady, and the nature of the general symptoms, will generally prevent any difficulty in the recognition of the disease.

From stomatitis it may be distinguished by attention to the points laid down in the following table, taken from MM. Rilliet and Barthez:

| STOMATITIS. | GANGRENE. |
|---|---|
| Begins by ulceration or by pseudo-membranous plastic deposit. | Begins by ulceration, which is sometimes gangrenous from the first, or by œdema of the cheek. |
| Odor very fetid and sometimes gangrenous. | Odor always gangrenous. |
| But little extension of the local lesion, which always retains the same appearances. | Considerable and rapid extension: the tissues assume a peculiar dark grayish tint. |
| But little swelling of the cheek or lips, or simply œdema of those parts, without deep-seated induration, tension, or unctuous appearance. | Extensive swelling and œdema of the cheek, with deep-seated induration, tension, unctuous appearance, purple spots. |
| Salivation rarely so considerable as to flow from the mouth; when present sometimes sanguinolent; never mixed with shreds of gangrenous tissue. | Salivation abundant; constant escape of fluid, at first sanguinolent, afterwards putrefactive. |
| Never an eschar on the exterior. | Often an eschar upon the cheek or lips. |
| Never complete perforation of the soft parts; denudation of the bones never occurs; loss of the teeth very rare. | Perforation of the soft parts frequent: denudation of the bones constant; loosening of the teeth constant, and their loss frequent. |
| Course of the disease slow when left to itself; recovery rapid under the influence of treatment. | Course rapid, and termination fatal, as a rule, when the disease is left to itself, and in spite of all treatment. |

Gangrene of the mouth may be confounded with malignant pustule. The method of diagnosis has been drawn by M. Baron in the following words: "Malignant pustule always begins on the exterior; affects the epidermis first, and extends successively to the corpus mucosum, chorion, and subjacent parts; whilst, on the contrary, the gangrene under consideration attacks the mucous membrane first, then the muscles, and lastly the skin."

PROGNOSIS.—The prognosis of true gangrene of the mouth is exceedingly unfavorable. The great majority of the subjects die in spite of all that can be done. Dr. Coates (*loc. cit.*, p. 14) says that a black spot on the outer surface of the swelling "has always been in my own experience, the immediate harbinger of death. It is proper to state, however, that I have heard it said that cases had recovered in this city, in which the gangrene had produced a hole through the cheek." MM. Rilliet and Barthez state that "death is the ordinary termination of gangrene of the mouth; though there are instances of recovery on record." Of 29 cases analyzed by them, only 3 recovered. MM. Guersant and Blache (*loc. cit.*, p. 596) state that unless arrested in the formative stage, it ends fatally almost constantly in from five to ten days, and frequently before perforation has taken place. Of 36 cases observed by M. Taupin in the Children's Hospital, at Paris, not one escaped (Guersant and Blache, *loc. cit.*, p. 597). The authors of the *Compendium de Médecine Pratique*, say of this disease (t. i, p. 632), "Death is the almost inevitable termination." Dr. Marshall Hall (*Edin. Med. and Surg. Journ.*, xiv, p. 547), reports six cases of the disease, two of which followed measles, one repeated attacks of pneumonia, one fever (type not mentioned), one worm fever, and one typhus fever. All but one, the case occurring in the course of typhus fever, in a girl twelve years old, died. This girl recovered, with, however, falling-in of the right cheek, "a frightful chasm" on the left side of the mouth, and caries of a portion of the alveolar process, palate bone, and second molar tooth. Recoveries sometimes occur, however, as in the case mentioned by Dr. Hall, after perforation, but nearly always with terrible deformities, with adhesions of the walls of the mouth to the jaws, with incurable fistulæ, &c.

The prognosis is more favorable in private practice than in hospitals. The favorable circumstances in any case are: good hygienic conditions; vigorous constitution of the child; the absence of dangerous concomitant disease; the continuance of appetite and strength; and a disposition to limitation and separation of the slough. Unfavorable symptoms are: weak and debilitated constitution of the patient; severe coexistent disease; prostration of the strength; and extension of the sloughing process. Death may also occur from hemorrhage in consequence of the separation of the slough, as in a case quoted from Hueter by Bouchut.

TREATMENT.—The reader need but refer to the remarks on prognosis to be assured that no treatment as yet discovered promises much success. We would call attention also to the following statement,—that the remarks about to be made apply only to true gangrene of the mouth, and not to all the cases described by some writers under the title of gangrenous sore mouth or even that of gangrene of the mouth, since, as already stated, they confound together true gangrene and ulcero-membranous stomatitis.

The treatment is divided into *local* and *general*. The *local treatment* recommended by the French writers, consists in cauterization of the sloughing parts with one of the mineral acids, with nitrate of silver, or with the actual cautery. This is the plan proposed by MM. Billard, Baron, Guersant and Blache, Barrier, Rilliet and Barthez, Bouchut, and Valleix. The authors of the *Bibliothèque du Médecin Practicien* remark, however, that nearly all the patients subjected to cauterization die, and that of the small number saved, there are as many who had not been subjected to that treatment, as there are of those to whom it had been fully applied. They wonder, therefore, that recent authors continue to repose the same confidence in it, as did their predecessors. "For us," they say, "we are of opinion that cauterization exerts but slight influence, if it have any at

*Med.*, vol. i, p. 36) recommends the application with a brush, of a mixture of equal parts of creasote and alcohol, after incisions have been made through the gangrenous parts. Dr. Condie (*op. cit.*, 6th ed., p. 174), states that he has found a strong solution of sulphate of copper (thirty grains to the ounce of water), applied very carefully twice a day, to the full extent of the gangrenous ulceration, by far the most successful lotion.

We have, ourselves, lately employed carbolic acid in two severe cases. The pure acid was carefully applied to the sloughing ulcer on the inside of the cheek, and subsequently a solution of one part of the acid in fifty of water, was frequently employed to wash out the mouth. The application of the undiluted acid seemed to have a beneficial effect, by checking the progress of the sloughing, and completely destroying the putridity of the dead tissue which had not as yet separated. One of the cases recovered quickly, without perforation of the cheek; but in the other death occurred, with symptoms of profound adynamia, though there was little, if any, extension of the gangrene.

It seems to us very clear, after the study of the treatment recommended by the different writers quoted above, that the most important part of the local management of the disease, is the early application of some escharotic substance to the ulcerations, or to the mortifying parts; the best is probably pure muriatic acid. This should be made use of twice or three times a day, observing the precaution to wash the mouth, immediately afterwards, with water, by means of a syringe. Later in the disease, when it has extended to the skin, the use of escharotics, or of the actual cautery, is still recommended by many writers, but opposed by others. We confess we should be inclined to prefer, at this stage, the use of muriated tincture of iron, as recommended by Dr. Gerhard, of carbolic acid as used by ourselves, of strong lotions of sulphate of copper, of solutions of nitrate of silver of moderate strength, or of the dressings of muriatic acid and honey of roses, as proposed by Underwood, in connection with carrot and fermenting poultices, as recommended by Underwood and Symonds. Throughout the course of the disease the mouth ought to be frequently cleansed by washing or injecting with solution of chlorinated soda, mixed with eight parts of water, or with a dilute solution of carbolic acid, which corrects at the same time the terrible fetor of the disease.

The importance of these measures can scarcely be over-estimated, since the presence of gangrenous tissue about the oral cavity must lead to the introduction of the poisonous results of putrefaction into the system, both by the fetid discharges which partly flow down the œsophagus, and still more by the contamination of the inspired air. Indeed, it seems quite possible, as urged by Dr. Keiller (*Edin. Med. Jour.*, April, 1862), that in cases of unchecked gangrene of the mouth, death occurs, in a great measure, from secondary blood-poisoning, resulting from the continued and unavoidable inhalation of air poisoned by emanations from the gangrenous sloughs. It is evident, therefore, that local applications both of caustics and antiseptic lotions, must be of great service, by arresting the sloughing and correcting or checking the foul discharges.

General Treatment.—All writers recommend the use of tonics, stimulants, and nutritious diet, unless the presence of high fever, or the state of the digestive organs, seems to contraindicate their employment. From our own personal experience in the treatment of this affection; from a consideration of what we have seen most successful in other forms of gangrene, as that following accidents and surgical operations in deteriorated constitutions; from what proved effectual in a case of idiopathic gangrene of the vulva, in a child ten years of age, which came under our charge; and from what is necessary in that analogous condition of the constitution which accompanies typhoid and cachectic diseases; we are induced to believe that the general treatment must be of at least as great importance as the local, and that the steady and persevering use of tonics, stimulants, and of the most strengthening diet, should always be insisted on from the earliest period, whether fever be present or not. The quantity of stimulants and the amount of food ought, it seems to us, to be measured only by the capacity of the digestive organs to receive and assimilate them. Of the tonics, the best are quinine and muriated tincture of iron, which may be given in syrup, in doses of a grain of the former with from three to five drops of the latter, four or five times a day, to a child three or four years old. The most suitable stimulants are very fine old brandy, Madeira wine given in considerable quantities, and, if the stomach is sure to receive it well, carbonate of ammonia, or better still, the aromatic spirits of hartshorn. The diet must consist of milk, made into punch with brandy, wine-whey, the yolk of eggs beaten up with wine, rich soups and beef-tea, animal jellies, and, if the child wish it, tender meat finely minced.

The room in which the child is placed ought to be large, if possible, and at all events thoroughly ventilated.

## ARTICLE V.

### THRUSH.

DEFINITION; SYNONYMES; FREQUENCY; FORMS.—Thrush is associated with the growth of a peculiar fungus, the *oidium albicans* (Robin), and appears as a deposit upon the mucous membrane of the mouth of a whitish or grayish-yellow exudation, of a soft cheesy consistence, at first adherent, and afterwards spontaneously detached, and generally unaccompanied by ulceration of the tissue beneath. This constitutes the whole disease in some cases, no other lesion being discoverable; whilst in other instances, and probably in a large majority, it is connected with some more or less serious general or local disorder. It is the disease described under the title of aphthæ or thrush, by Underwood and Eberle; of aphthæ, by Dewees; of erythematic stomatitis, with curd-like exudation, by Dr. Condie; and of aphtha lactantium, aphtha lactamen, and aphtha infantilis, by the older writers. It is the muguet of the French.

The *frequency* of the disease is very great in hospitals for children. It is common also amongst the children of the poor, and comparatively rare in the middle and upper classes of society. It occurs under two forms, the *idiopathic* or *primary*, and *symptomatic* or *secondary*. By the first is meant the form in which the affection of the mouth is the only perceptible lesion; by the second, that in which disease of other organs, or of the constitution generally, precedes the buccal exudation.

CAUSES.—PREDISPOSING CAUSES.—The disease occurs at all *ages*, but is by far most common during the first two months of life. *Altered health* from any cause, *deficient ventilation*, and *want of cleanliness*, strongly predispose to the production of thrush. Much difference of opinion exists as to the nature of the connection between *enteritis* and thrush, especially since the publication of the researches of M. Valleix, who thinks that the latter disease is almost always the consequence of the former, and who doubts the existence of purely local cases of thrush. MM. Trousseau and Delpech, on the contrary (*Journ. de Méd. de MM. Beau et Trousseau*, January, February, April, May, 1845), report 14 cases out of 58 in which there was neither gastric nor intestinal complication, and others in which enteritis did not occur except as a consequence of thrush. They state, however, that though enteritis does not exist in all cases, and is a simple complication in others, it is sometimes the true cause, the sole origin of the disease. Again, Dr. Berg, in a very accurate and careful history of the disease (*Brit. and For. Med. Rev.*, October, 1847, p. 420), in which he asserts and endeavors to show its *cryptogamic nature*, states "that both the local and general symptoms which accompany thrush in the child are, in most cases, immediate or secondary consequences of the presence of the parasite, and not to be regarded as the causes of this fungoid vegetation." It is believed by many observers to be *contagious*. This opinion is rendered doubtful, however, by the assertion of MM. Baron, Billard, Guersant, and Valleix (*loc. cit.*, t. iv, p. 63), that they have known children in health to be fed with the same spoon which has been used for others affected with the disease, without their contracting it. M. Bouchut, on the contrary, and Dr. Berg (*loc. cit.*), both of whom believe in the cryptogamic nature of thrush, assert it to be contagious. Dr. Berg is of opinion that it is "conveyed from one patient to another by sporules or fragments of sporules, in the dried state, floating in the atmosphere, but that still more frequently it is propagated by the bottle from which children with thrush have been fed, or by the nipple, especially where, as in many hospitals, two children are suckled by one nurse." This gentleman made many experiments in order to decide this question, all of which proved favorable to the idea of contagion.

Of various predisposing causes which have been cited as productive of the disease, the ones most generally admitted are the use of *artificial diet*, particularly one consisting of farinaceous substances, and, in children who are suckled, an *unhealthy state* of the nurse's milk. To show the truth of these assertions, I make the following quotations. Underwood says: "A principal remote cause of this disease seems to be indigestion, whether produced by bad milk, or other unwholesome food, or by the weakness of the stomach." Dewees remarks that "children fed much upon farinaceous substances, are especially exposed to the attacks of this disease, particularly when their food is sweetened with brown sugar or molasses." Dr. Eberle says: "Unwholesome and indigestible nourishment, and over-distension of the stomach, during the early stages of infancy, almost inevitably lead to the occurrence of aphthæ (thrush). Bad and old milk, and thick farinaceous preparations sweetened with brown sugar or molasses, are especially apt to give rise to the disease." Much influence is ascribed by Dr. Berg to the operation of artificial food in favoring the growth of thrush. M. Valleix (*loc. cit.*, p. 60), who has studied the subject with the greatest care and attention says that amongst the hygienic conditions which may act as predisposing causes "one alone has seemed to me to exert a positive influence, and this is *improper alimentation.*" He adds, that since the publication of his *Clinique*, he has several times met with cases of thrush, "and I have always found that the children had been put upon feculent diet. On the other hand, I have never known a child to have the disease, who had been suckled exclusively during the early months of life." MM. Trousseau and Delpech, in the very valuable paper on muguet (thrush), already quoted, say: "We would be justified, therefore, in asserting, that we have never known an infant to die of thrush, who had been suckled at a healthy breast, or whose health had not been dangerously compromised by other causes." To show in another mode the influence of this cause, we will state that of 29 cases of the disease observed by these gentlemen in children who were suckled, only 7, or one-fourth, died; whilst of 22 in those who were not suckled, 17, or more than three-fourths, died. Our own experience is precisely that of MM. Valleix, Trousseau, and Delpech.

*Season* exerts a considerable influence upon the production of thrush, as M. Valleix found that more than half the cases occurred during the three warmest months of the year.

*Exciting causes.*—The deprivation of the breast, and a consequent resort to artificial diet, particularly one consisting of farinaceous substances, is probably much the most frequent exciting cause of thrush. An unhealthy state of the milk of the nurse will also act as an exciting cause. We have met with two cases of the disease, one of them fatal, which appeared to depend upon the latter circumstance. Dr. Berg believes that prolonged sleep from any cause disposes to the disease, by favoring the growth of the parasite, or by so changing the secretions of the mucous membrane of the mouth, as to render them important agents in augmenting the disorder. An acid state of the buccal secretion is cited as a cause by many authors, and is clearly proved to exist in a great many instances.

ANATOMICAL LESIONS.—The characteristic exudation is found upon the mucous membrane of the mouth, pharynx, œsophagus, and in rare cases, of the stomach and intestines. The question of the possibility of the extension of thrush to the gastric mucous membrane has been much discussed, and the highest authorities have been almost equally divided upon it. This disagreement has arisen solely from the want of microscopical examination, which enables the observer to distinguish readily between true thrush and other appearances of the gastric mucous membrane which closely resemble it. The most conclusive demonstration of its occurrence upon the mucous membrane of the stomach has been recently furnished in a valuable article on this subject, by M. J. Parrot, *Du Muguet Gastrique et de quelques autres localisations de ce parasite. Arch. de Physiologie Norm. et Path.*, Nos. 4 and 5, 1869. It is a curious fact, and a very important one, insisted upon by MM. Trousseau and Delpech, and other observers, that the false membrane never extends to the nasal or air-passages; and they call attention to the singular difference in this respect between the affection under consideration and diphtheritic inflammation, which attacks almost exclusively the nostrils, pharynx, larynx, and bronchia. It appears, however, from recent observation, that the peculiar growth has been found upon both the epiglottis and the inferior vocal cords; and Parrot (*loc. cit.*) gives the details of a case in which the fungus was found in the air-vesicles of one lung.

Lesions of the digestive mucous membrane are met with in nearly all the cases. M. Valleix states that softening of the gastric mucous membrane is almost constant, and that it is often accompanied by redness and thickening. The authors cited above are of opinion that the gastric lesions have been greatly exaggerated, and assert them to be much the same as exist in other diseases foreign to the digestive apparatus. Various morbid alterations of the mucous membrane of the intestines exist in nearly all fatal cases. This fact is acknowledged as well by MM. Trousseau and Delpech, who deny the invariable connection of these alterations with thrush, as by M. Valleix, who asserts the connection almost without reserve. In nearly all cases the mucous membrane of the large intestine presents some of the following lesions, which are mentioned in the order of their frequency: thickening, injection, softening, or ulceration. In the ileum are found, in a great many cases, injection, softening, or thickening of the mucous membrane, unusual development of the mucous follicles, and tumefaction and ulceration of the glands of Peyer.

In severe symptomatic cases a certain amount of erythematous inflammation is commonly found upon the skin of the buttocks and thighs, and ulcerations sometimes exist upon the inner ankles. Traces of inflammation sometimes, but very rarely, exist in the membranes of the brain, and the lungs not unfrequently present the lesions of secondary pneumonia. Before leaving this part of the subject, we may remark that in the few cases we have met with in private practice, no ulcerations occurred upon the malleoli, and the erythema was observed only in the neighborhood of the anus.

Dr. Dewees describes the autopsy of a child who died about the end of the first month of life, of what he designates as aphthæ. The lesions coincide so closely with those which are characteristic of thrush, that we will quote the description, in order that the two may be compared together by the reader. "We found the whole tract of the œsophagus literally blocked up with an aphthous incrustation, to the cardia, and there it suddenly stopped. The inner coat of the stomach bore some marks of inflammation, as did several portions of the intestines; but not a trace of aphthæ could be discovered below the place just mentioned." In the previous description of the case, he says that coat after coat of aphthæ were thrown off, and each new crop appeared to be more abundant, and less amenable to remedies. (*Dewees on Children*, p. 304–305.)

Dr. Eberle says: "I have myself had an opportunity of examining the body of an infant, that had died of this disease (aphthæ or thrush). In this case the aphthæ were very distinct, throughout the whole course of the œsophagus. The stomach and bowels presented nothing that bore any resemblance to this eruption; but there were decided marks of inflammation in the mucous membrane of the small intestines, with a vast number of minute superficial ulcerations, and larger patches of softening of this tissue, throughout the colon and lower part of the rectum." (*Diseases of Children*, p. 172–173.)

SYMPTOMS.—We shall first describe the characters of the exudation, and then proceed to the consideration of certain general and local phenomena which exist to a greater or less extent in both forms of the disease.

The mucous membrane of the mouth is often somewhat red, dry, and tender for a longer or a shorter time (generally from one to three days), before the appearance of the exudation, and at the same time the papillæ of the tongue swell and become protuberant. Next the exudation shows itself in the form of small, whitish points, sometimes on the tongue first, and in other cases on the inside of the lips, whence it extends to the cheeks in idiopathic mild cases, and to the roof of the mouth, soft palate, pharynx, and œsophagus, in the grave symptomatic form. The points of false membrane first deposited rapidly increase in size and thickness, so that in from one to three or four days, they assume the form of large patches, or a continuous membrane, which covers the whole or a considerable portion of the cavity of the mouth. When the exudation is recent, it is thin, and its surface smooth; when, on the contrary, it has been longer deposited, it becomes thicker, and its surface is rough. It is at first of a milk-white or pearly hue, but when undisturbed assumes a grayish or yellowish color. It is soft in consistence, breaking down under the finger like cheese, and presenting no traces of organization to the naked eye. It adheres to the mucous membrane with considerable tenacity at first, but becomes looser after awhile, and is detached spontaneously at last without any lesion of the tissue beneath.

The foregoing description applies to the exudation as it appears to the unassisted eye. We pass next to give an account of the characters it presents, when subjected to microscopical examination, and in so doing shall quote the language of Berg, who first discovered that thrush essentially depended upon the presence of a peculiar parasitic fungus, to which Robin has given the name of oidium albicans. Dr. Berg (*loc. cit.*) states, that the white coating of the exudation consists of epithelium, thickened by the swelling of its constituent cells; from the epithelium there springs a parasitic fungus in greater or less quantity, so that the chief portion of a patch of aphthæ (thrush) is composed either of epithelium or else of the parasitic growth. Under a magnifying power of from 200 to 300 diameters, an aphthous crust is seen to consist of epithelial cells, with a more or less interwoven coat of fibres, and a variable number of spherical or oval cells, without any sign of exudation-corpuscles, but only a small quantity of molecular albuminous deposit. "We can often trace the successive development of these cells from a spherical one of the smallest size, to an oval cell, and thence to a filament; and we have no doubt ourselves that the smaller cells are sporules, out of whose development the larger oval cells are formed, and finally, the filaments in the same manner as has been observed in other fungoid growths of this nature." Numerous projecting fibrils are observed in the circumference of an aphthous crust when submitted to the microscope; but these are rendered infinitely more clear by a weak solution of potash, which dissolves the albumen, and renders the cells of the epithelium transparent, while, at the same time, it diminishes their intimate cohesion, and the network of vegetable fibres is more plainly seen. "These fibres are cylindrical, with sharply defined dark edges, and their centres are transparent in transmitted light; they are generally equal in thickness, but at times they are, as it were, knotted together, and divided by distinct walls of separation. . . . . In their interior, these fibrils often exhibit nucleated cells; occasionally these are very numerous, and of small size, but at times they are larger. In their course the fibrils divide into numerous branches, whose diameter is not less than that of the original stem, and I have occasionally observed these ramifications to increase in thickness, at their free extremity, and to terminate in a club-shaped end with a species of cell. From the sides of the fibrils spring numerous sporules, forming a point of departure for new ramifications. . . . . Careful investigation has shown us that these cells are placed upon the sides of the fibrils, and in particular that they are congregated around the terminations of the latter. It must, therefore, be admitted that the cells and the fibrils are both constituent parts of one and the same organization. When this growth vegetates undisturbed, its fibrils penetrate between the layers of the epithelial cells, but do not extend deeper than the inferior layer, though they spread laterally in every direction. On the free surface of the epithelium, the ramifications rise above the surface, exhibiting at the same time an abundant fructification, which gives a yellowish hue to the exterior."

M. Parrot, in describing the appearances of thrush upon the gastric mucous membrane, states that the disease presented itself in the form of small prominent rounded masses, of yellowish color, and either isolated or in groups. These were adherent to the mucous membrane, nearly all umbilicated, and upon pressure the central depression became filled with a cheesy-looking material. On microscopic examination of sections, the spores and filaments of the muguet were found infiltrating the tissue, and as it were planted there, at times scattered in small numbers, at others accumulated in large masses, and holding between them many oil-drops and some débris of the mucous membrane. The muscular coat of the stomach was not involved, but in some instances the spores and filaments penetrated the mucous membrane, and extended to the submucous space. In other cases, the mucous membrane was only superficially involved.

The reader is referred for a more full account of the cryptogamic theory of thrush to the interesting review of Berg's work above quoted, and to Bouchut's work on the diseases of new-born children; and for a complete description of the oidium albicans to the work of Robin, *Histoire Naturelle des Végétaux Parasites*, Paris, 1853; the articles of Parrot above quoted; and the article on Thrush in Vogel's work on the *Diseases of Children* (Amer. ed., 1870, p. 99).

*Symptoms of the Mild Form of Thrush.*—This form is the one most frequently met with in private practice. It is mild in all its characters, and often presents no other symptoms than those connected with the mouth. These are *heat* and *dryness*, with *tenderness* of that part. The tenderness is shown by the child's crying and jerking the head backwards when the finger is introduced into the mouth, whereas, in health, the infant will almost always seize the finger and suck it with considerable force. It is shown, also, by the refusal to take the breast, or by the difficulty with which this is done, the child occasionally letting the nipple drop with a cry of pain, then seizing it again, and again dropping it with fretting or screaming. In some of the cases there are various signs of disorder of the digestive tube, which are, however, seldom severe. They consist of slight diarrhœa, the stools being at first yellow, and afterwards green and acid; of occasional vomiting, of attacks of colicky pain, and sometimes of feverishness. To show how frequent is the occurrence of diarrhœa in thrush, and to prove also that it is not a necessary accompaniment of the disease, as has been supposed by some persons, we will quote the fact mentioned by Dr. Berg, that of 115 cases, in only 29 did the stools retain the normal yellow color throughout the whole course of the disease; while in the remaining 86, green evacuations appeared simultaneously with the invasion, or supervened at a later period. We may cite also the cases reported by MM. Trousseau and Delpech, of which only 14 out of 58 presented neither gastric nor intestinal complications.

The amount of exudation is generally small in this form, and it rarely extends behind the soft palate. The *duration* is usually between four and nineteen days, the average being about eight or twelve. The termination is almost always favorable.

*Grave Form.*—It is under this form that the disease is most apt to occur in public institutions for children, and particularly in foundling hospitals. That it sometimes occurs, also, in private practice, will not be doubted, we think, by any who will read with care the descriptions of the disease given by Underwood, Dewees, and Eberle. We have ourselves met with two fatal cases in private practice, which presented all the symptoms described by M. Valleix as characterizing those observed by him in the Foundling's Hospital at Paris, with the single exception of the ulcerations upon the internal malleoli. They were both children of parents who had every comfort at their command. One died at the age of four weeks, in consequence of the attempt to rear it on artificial diet. The other perished when six weeks old, apparently from some unhealthy condition of the mother's milk, which seems the more probable from the fact that the same mother had previously lost two children under precisely similar circases it is much longer, from a few weeks to two months. Relapses are not uncommon.

Before closing our remarks upon the symptoms, it is proper to state that the disease sometimes occurs at the termination of acute local affections, as pneumonia, bronchitis, or pleurisy, under which circumstances, there will be, in addition to the symptoms peculiar to thrush, those of the malady which preceded it.

NATURE OF THE DISEASE.—Repeated microscopic examinations have so uniformly confirmed the statements of Gruby and Berg, that it is no longer doubtful that a peculiar parasite, oidium albicans, is a constant element in the exudation of thrush. It is, however, far from being so well determined what relation this growth bears to the disease; since, while one class of authorities consider it the essential and sole cause of the other local and general symptoms, another regard it merely as an epiphenomenon, the spores of the parasite finding a suitable nidus for development on the already diseased mucous membrane. Fortunately, the solution of this question is of no very great practical importance, as the causes of the disease are well ascertained, and its prophylactic and curative treatment will not be affected by the view entertained.

DIAGNOSIS.—The diagnosis of thrush is rarely difficult. Aphthæ differ from it in their vesicular nature during the formative stage, in the ulcerations which follow the vesicles, and in the absence of false membranes. From ulcero-membranous stomatitis it may be distinguished, by the formation in that disease of false membrane in layers from the beginning; by the presence of ulcerations; by the spongy, bleeding state of the gums; by the fetid breath; by the absence of the abdominal symptoms which exist in thrush; and by the microscopic appearances of the deposit.

PROGNOSIS.—The prognosis must depend, in great measure, upon the circumstances under which the disease occurs. In private practice, and whenever the patients are suckled by their own mothers, or by healthy nurses, it is a mild affection. But in foundling hospitals, on the contrary, where the children are mostly brought up by hand, it is one of the most fatal maladies to which children are subject. The prognosis varies according to the form of the disease. The mild form is rarely fatal, while the grave form is fatal in the great majority of the cases.

To show the frightful severity of the disease under certain circumstances, we may mention that of 140 cases which occurred in the wards of M. Baron, at the Foundling's Hospital of Paris, only 29 recovered; while of 22 cases observed by M. Valleix, in the same hospital, but 2 recovered (Valleix, *loc. cit.*, p. 74). Again, M. Bouchut states that of 42 cases observed by himself, at the Necker Hospital, 14 were of the idiopathic (mild) form, all of which terminated favorably; and 28 of the grave or symptomatic form, of which 20 died, and 8 left the hospital still laboring under the disease. Of the 20 fatal cases, 12 presented the lesions of chronic entero-colitis, 4 of acute entero-colitis, 8 of pneumonia, and 2 of hydrocephalus. It may be stated, in conclusion, that the danger is greatest, in private practice, when the attack occurs in a child fed on artificial diet; when there is reason to suspect an unhealthy state of the nurse's milk; and in proportion to the extent and quantity of the exudation, its resistance to treatment, and the severity and obstinacy of the abdominal symptoms.

TREATMENT.—*Prophylactic Treatment.*—The most certain means of preventing thrush are evidently to procure for the child a full, healthy breast of milk, to give it a good habitation, to secure for it perfect cleanliness, and to attend properly to its clothing. When it is impossible, from any cause, to obtain a nurse for the child, the diet ought to be most carefully regulated as to quality, quantity, and times of administration. Careful attention to these points will, and, we doubt not, have, greatly diminished the number and lessened the severity of the disease in private practice.

GENERAL TREATMENT.—It is clear that the successful management of thrush must depend much more upon judicious regulation of the hygiene of the child, than upon any therapeutical system that can be devised. The most frequent cause of the disease is, as we have seen, artificial diet, especially one in which milk is sparingly used or excluded, or an unhealthy state of the nurse's milk. It is reasonable to conclude, therefore, that attention to the removal or mitigation of these and other unfavorable hygienic conditions, constitutes the most important indication of treatment.

If a child who has been attacked with thrush is suckled exclusively, the milk of the nurse ought to be subjected to chemical and microscopic examination; and should it be found to present unhealthy characters, another nurse ought to be procured as soon as possible. In all such cases the nurse must pay strict attention to her diet, avoiding all articles which she knows or suspects to disagree with her, and all very rich dishes. Dewees recommends that she should abstain from most common vegetables, except rice, and from all kinds of liquors, especially the fermented.

When the disease occurs in a child who is nursed and fed alternately, and the remark about to be made applies still more appropriately to one fed entirely upon artificial diet, the most important remedy in the case is to procure a good wet-nurse. This is far better than any medical treatment that can be instituted. Often, however, this is impossible, and, under such circumstances, the regulation of the diet ought to be attended to with the utmost care by the physician himself, who should specify its material, quantity, and mode of preparation.

As we shall be obliged constantly to refer to the proper diet for young children in our future articles on diseases of the digestive organs, and indeed all through this work, we think it will be best to make some general and extended remarks on the subject here, where we first meet with a disease, the cause of which is almost always improper food, and the cure of which is the abandonment of a faulty, and the substitution of a proper aliment.

In the first place, we wish to repeat the statement already made, that the breast gives the only food for infants which can be relied on as the correct one. This may seem very much like saying that white is white, and red is red, or that two and two do indubitably make four; indeed, to ourselves it seems utterly superfluous, but we have known so many medical men, men in authority in the nursery, and such hosts of fathers and mothers, who cannot be made to believe this, that we feel compelled to reiterate our own individual opinions as strongly as possible. But cases do constantly occur in which a young infant must be wholly or in part fed artificially, and here we have to recommend some substitute for breast-milk. In this city, asses' milk, which is conceded to be more like human milk than that of any other animal, cannot be had, and we are forced to take cow's or goat's milk. The latter is not so common as to be readily obtained, and practically we are driven to the use of the former.

In choosing cow's milk, the first thing to be thought of is the purity of the milk. In small towns and in the country it is very easy to obtain fresh pure milk, but in large cities it is often very difficult. Still, with due care and diligence, and money, it can generally be done. Our own practice has always been to choose a milkman who himself brings milk from a farm, or who, at least, employs himself the man who delivers it. We never have, and never shall, so long as we can help ourselves, take milk from those middle-men who buy it of anybody that may have it to sell. Moreover, the person who has charge of the child should always, if possible, know the milkman personally, and know exactly where he comes from, and what manner of man he may be. An *honest* farmer or dairyman who pastures and feeds his own cows on a healthy farm, is the man to be employed to furnish milk to the poor little baby who has to seek another dairy than his own mother's. If the character of the milkman is not a sufficient guarantee, or if, from any accident, the milk has to be changed, or if any doubt arises as to its quality, there are some simple methods of judging which can be made use of by any person of ordinary intelligence, and which will reveal any gross deception on the part of the milk vender.

A good specimen of cow's milk ought to be slightly acid or neutral; it should contain a certain average proportion of cream, and it should have a certain average density.

These points may be ascertained with sufficient accuracy to guide us in our choice or refusal of any sample of milk, in the following mode. Litmus paper turns red when touched by any acid; a very weak acid will do this. If a good specimen of litmus paper (which can be procured of the apothecary) turns faintly red, when dipped into milk, the milk is properly acid; if turned bright red, the milk is too acid. When no change is produced on the litmus paper, the milk is either neutral (which is sometimes the case with healthy milk), or it is alkaline. To determine whether it be neutral, turmeric paper, which is turned brown by alkaline solutions, must be used. If the specimen is found to be alkaline in a marked degree, either the cow is diseased in all probability, or some alkali has been added to the milk.

It is a curious fact, that Dr. Parkes (*Manual of Practical Hygiene*, 3d ed., London, 1866), is almost alone in asserting that healthy cow's milk is either faintly acid or neutral. Most authorities assert that it is alkaline. In order to determine this matter for ourselves, we tested the milk of thirty-one fine cows, fed on the finest pasturage in the neighborhood of this city. This was done by taking the milk, just as it was drawn from each animal, separately in the milking-house, and testing at once with the best litmus paper. In all the paper was turned red, more or less distinctly. Dr. John Ashhurst, of this city, tested for us with both litmus and turmeric paper, the milk of nine fine Durham and of four Alderney cows, belonging to his father, all on the finest pasturage. He says that in one Durham and in one Alderney the milk appears to have been almost neutral, and in all the rest more or less acid. In testing the milk of another Durham, litmus paper was reddened, whilst the turmeric was also slightly changed, but he supposed the latter change to be due to a greasy condition of the milk, owing to the fact that the cow was in the latter period of a long lactation.

To determine the proportion of cream, we may make use of a glass vessel, made of a section of a cylinder, tall, and not too wide, and graduated to inches, with the upper inch divided into hundredths, or a French glass divided into centimetres, such as may be found in the shops for the sale of chemical apparatus. This is to be filled to the upper mark with milk, and put aside for twenty-four hours; at the end of that time the cream will have separated, and risen to the top, and its proportion can be read off on the graduated scale. According to Dr. Parkes, the cream should be from 4 to 6 per cent. In the milk of Alderney cows, it will reach 30 per cent. to 40 per cent. This seems to us too large a proportion for the use of children.

We think, however, that the average of cream given by Dr. Parkes is probably rather too low. The *Maison Rustique*, a French work of very high authority on agriculture, states (tome iii, p. 61), that the milk of cows, of good race, well kept, furnishes 15 per cent. of cream. The milk supplied by the milkman, employed by one of us, gave 14 per cent. of cream on one occasion, and 10 at another. The specific gravity of the former specimen was found to be 1029. Of three other specimens, bought at hazard, of different dealers, the proportion of cream was 7 per cent., 6 per cent., and 14 per cent., respectively. We are disposed to think, therefore, that families ought to endeavor to procure milk containing at least 10 per cent. of cream.

We next have to ascertain the density, in order to determine the proportion of water. The most common adulteration of milk is, of course, with water, to increase its quantity, and so augment the profits of the salesman. The density or specific gravity, let it be remembered, is no safe guide as to the proportion of cream. That must be settled in the mode just described. But the density gives the proportion of water. The specific gravity of good, pure milk, is given by Dr. Parkes at 1030.5, or 1026, at a temperature of 60° Fahr. We found it in an excellent specimen to be 1029. Dr. Parkes found that when, in milk of the specific gravity above mentioned, one part of water was added to nine of milk, the specific gravity fell to 1027 or 1023; when three parts of water were added to seven of milk, it fell to 1021, or 1017.5; and when five parts of water to five of milk, it fell to 1015. These were the proportions obtained by several experiments.

We found that the specific gravity of a specimen of excellent milk, as ascertained by a hydrometer, was 1028. When to this milk was added one-fourth part of water, the specific gravity fell to 1024, and when a half had been added it fell to 1020. In another specimen, the specific gravity, obtained in the same way, was 1030 at a temperature of 64° Fahr. When to this specimen one-half water was added, the specific gravity fell to 1020.

By these three simple methods of examination, the acidity or alkalinity of the milk, the proportion of cream, and the proportion of water can be determined. If the milk is either strongly acid or alkaline, it is not to be trusted. If it be strongly acid, it has undergone the acid fermentation, and is not fit for use. If it be strongly alkaline, it has either been adulterated by the addition of an alkali, probably, according to Dr. Parkes, carbonate of soda, to prevent or arrest the lactic acid fermentation, or it may have been taken from a diseased cow. Dr. Parkes suggests the latter probability in a doubtful way. Dr. J. F. Simon, of Berlin (*Animal Chemistry with Reference to the Physiology and Pathology of Man*, vol. ii, p. 67), states, that he analyzed milk drawn from the teat of a cow having vaccinia, and found it strongly alkaline, and showing with the microscope mucous and pus corpuscles, while that drawn from a healthy teat had a mild acid reaction, and contained no pus or mucous corpuscles. He also states (page 68), that Herberger has analyzed the milk of cows suffering from the grease, and found it to contain an increased quantity of the alkaline salts, in the first stage; in the second stage it was thick and viscid, and had, besides, an unpleasant and putrid taste and smell. In both stages, the presence of carbonate of ammonia (an ingredient never before observed in the milk) was detected.

The most common adulteration of milk is with water. The mode of detecting this, by ascertaining the specific gravity, has already been given. Starch is sometimes used to thicken a thin milk. The microscope will detect this by showing the presence of the starch granules.

The mother will often wish to preserve milk, especially in our hot summer weather, or for a few days, when on a journey. The best preservative in hot weather, for the day, is of course a good ice-chest. Dr. Parkes says that when boiled, "the bottle quite filled, and at once corked up and well sealed, the milk lessens in bulk, and a vacuum is formed above. It will keep thus for some time. A little sugar aids the preservation. If the heat is carried in a close vessel to 250° Fahr., the milk is preserved for a very long time, even for years; the butter may separate, but this is of no consequence;" or, if a little carbonate of soda and sugar is added, without boiling, he says it will keep for ten days or a fortnight. Cooley, in his *Cyclopædia of Practical Receipts*, states, that the addition of ten to twelve grains of carbonate, or bicarbonate of soda, to each pint of milk, will preserve it for eight or ten days in temperate weather, and adds that this addition is harmless, and, indeed, is advantageous to dyspeptic pa tients. The method of boiling, proposed by Dr. Parkes, is the one now so much used for preserving fruits fresh.

Having determined upon the use of cow's milk, we have next to consider its mode of preparation.

It should never be given pure to young infants, at least such is our clear conviction. We still believe that the old rule, of two parts of water to one of milk, is the proper one during the first month. We know that some of the more recent writers, and not a few of the physicians of this city, now order half water and half milk, and some children do well on that proportion; but we still believe that when the milk is of full average richness (containing ten or fifteen per cent. of cream, and having a specific gravity of 1028 to 1030), the old rule of two-thirds water is safest. And this is certainly true of all sickly children within the month. It is easy to increase the proportion afterwards, if the child does not develop as it ought; but the stomach once seriously deranged and overloaded by too rich a food, a severe and even a lingering illness may be the penalty the child will have to suffer.

When the child comes to be one or two months of age, the proportion may be increased to one-half, with care; always, however, returning to the first rule, should the child exhibit signs of gastric disturbance, or should the stools contain many whitish lumps, consisting of undigested caseine. At the age of five or six months the proportion may be made two-thirds milk, and thus, gradually, the milk may be given pure, though we have seen many children who, even at a year of age, did better with a moderate dilution than with the pure fluid.

The *quantity* of food to be given each day, is a very important consideration, and one about which less is usually said than the matter deserves. In the first edition of this work, published in 1848, it was stated that, from various inquiries and observations, we were led to believe that a healthy infant of two or three weeks old, would receive, from a good nurse, and digest well, about a pint of food in twenty-four hours, and that by the end of the first, and in the second month, the quantity taken by the child increased to a pint and a half or a quart. Some of the data upon which these assertions were based were the following: A woman, attended in her confinement by one of us, had a pint of milk drawn, by the nurse, daily from the breasts, in addition to what the child took. On asking the nurse how much she supposed the child—a vigorous, hearty boy—took at the same time, her reply was that, judging from the frequency and vigor with which he nursed, she supposed he took as much as was drawn from the breasts. Another patient lost her child at birth, and desiring to go out as a wet-nurse, kept up the flow of her milk by using a puppy. Six weeks after her confinement, a good breast-pump was given her, and she was desired to keep all the milk she could obtain in twenty-four hours. The quantity measured exactly a quart.

It was also stated, in that edition, that careful inquiries were made, in regard to this matter, of one of the most experienced and intelligent monthly nurses we ever knew. She was desired to answer accurately the two following questions:

1. How much milk do you think a healthy mother gives to her chi daily, after the flow is fairly established?

2. What quantity of nourishment do you give in twenty-four hour to infants you are compelled to feed exclusively?

The reply to the first question was, that she had often drawn more than pint from the breasts in the twenty-four hours, in addition to what a health child took, and that she had frequently taken as much as three pints fro women who had lost their children. She supposed, therefore, that hearty child would take, during the first two weeks, at least a pint, an much more afterwards.

To the second question she replied, that she usually gave to heart children of one, two, and three weeks old, a pint of food in twenty-fou hours.

It was stated in the first edition of this work that, judging from th above data, a young infant ought to take at least a pint of nourishmen in the twenty-four hours. Our experience, since that time, has convince us that, if anything, this estimate is rather too low than too high. Now we should say that, in the first ten days after birth, a pint or a little ove is about the right quantity. After that period a pint and a half to a quar is probably the proper amount up to the second month. In the secon and third months many children require a full quart, and some thre pints; though, after all, we must be ruled very much by the instinctiv wants of the individual child. When fed at regular intervals, upon food of the proper strength, we do not think children often take more than they need.

In the first month the child ought to be fed every two hours, if it take the food well. After the first month, once in three hours is usually the best rule. Feeding the child once in three hours, between six in the morning and six in the evening, and twice in the night, would give six meals in the twenty-four hours. If six ounces (a gill and a half) be give each time, the child would get thirty-six ounces, which is a little over a quart. As the age increases, eight ounces may be given every four hour which would make a quart and a half; and we have met with very fe children who exceed this, particularly as by this time the food consis of two-thirds or three-fourths milk, or even pure milk. It may seem needless to add that, unless the child is taking decidedly less than th average stated above, it ought not to be in any degree forced or entice to swallow more than it takes willingly. The moment it has had enoug the nurse ought to cease to offer any more.

As this matter of the quantity of artificial food necessary for the develop ment of the child is a very important one, and as it is a point which ha not been very clearly defined by most writers, we have thought it well to lay before our readers the following calculation of what infants may nee from the estimate made by Dr. Parkes as to the amount of food necessar for adults.

According to that author, an adult of average size and activity wil under conditions of moderate exertion, take in twenty-four hours fro $\frac{1}{28}$th to $\frac{1}{20}$th of his own weight in solid and liquid food. The relativ proportion of the so-called solid and liquid food varies greatly, but is usually about 40 oz. avoirdupois of the former, and 60 oz. of water. As, however, all the so-called solid food—bread, meat, &c.—contains a certain amount of water, the actual average amount of water-free food taken by an adult, weighing 150 lbs., is 23 oz., or $\frac{1}{105}$th of the weight of the body; and the amount of water about 75 oz. Or, in other words, every pound weight of the body receives about 0.15 oz. of water-free food and 0.5 oz. of water in twenty-four hours. This water-free food is composed as follows, according to Moleschott:

| | oz. avoirdupois = 437.5 gr. |
|---|---|
| Albuminous substances, . . . . | 4.587 |
| Fatty " . . . . . | 2.964 |
| Carbo-hydrates, . . . . . . | 14.257 |
| Salts (of all kinds), . . . . | 1.058 |
| | 22.866 |

On the basis of these calculations, an infant at birth, the average weight being 7 lbs., would require 1.05 oz. of water-free food; and a child weighing 20 lbs., which is probably the average weight of healthy children of five to six months old, would require 3 oz.

Assuming the total solid of cow's milk to be 10 per cent., which is rather less than the average as given by Becquerel and Rodier (see composition of healthy milk), it would require to yield an ounce of water-free food rather more than 10 ounces of milk.

Thus on this supposition (*i. e.*, that the total solids of cow's milk of sp. gr. 1026, equal 10 per cent.) one pint imperial (20 oz.) will contain in round numbers,

| | | |
|---|---|---|
| Caseine, . | 262 | grains. |
| Fats, . . | 217 | " |
| Lactin, . . | 341 | " |
| Salts, . . | 43 | " |
| Total, . . | 863 | " = very nearly 2 oz. avoirdupois of water-free food. |

According to this, therefore, the infant at birth requires little more than ½ pint imperial of unskimmed cow's milk; the child at five or six months about 1½ pints imperial.

It is evident that the proportion of fat and water is in great excess in this exclusively milk diet; but these two principles are required in early infancy in much larger relative amount than at a later period of life. It will also be seen that by diluting the above amounts of cow's milk with one to two parts of water, we obtain, as the proper amount of food for new-born infants, from a pint to a pint and a half; and for children about five or six months old, from 3 to 4 pints; amounts which correspond closely with the results obtained from examination of the quantity of milk secreted by nursing women.

Some authorities recommend the regular use of lime-water instead of simple water, for the purposes of dilution. We ourselves have not been in the habit of using it, except when the rejection of the milk in hard and large curds, or the frequent appearance in the stools of small whitish lumps of undigested caseine, showed a too early and too great coagulation of the milk in the stomach. In such cases we always direct lime-water to be added to each meal. As to the quantity of this alkali, we will state that Dr. Eustace Smith (*Wasting Diseases of Children*, London, 1868, p. 33), directs, during the first six weeks of life, that half lime-water and half milk be used. Dr. Routh (*Infant Feeding*, 2d ed., London, p. 397) advises that from an ounce to an ounce and a half of lime-water be added to each pint of food. The latter is about the proportion we use. In many cases, however, our patients do perfectly well without any.

Besides the dilution with water, sugar must always be added. Formerly, the best lump white sugar was always used. Brown sugar has been found not to answer well. Of late, experience has shown that sugar of milk, which is the natural sugar found in this fluid, has been found preferable to cane sugar. The amount of sugar of milk to be added should always be specified by the physician, and not left to the hap-hazard judgment of the nurse or mother, as most persons use too much. A drachm and a half, or about a heaped teaspoonful, is the proper proportion for each eight ounces of food.

Many different and more or less complicated preparations of food have been recommended by different authorities. We do not think that any of the various feculent substances, so much vaunted and advertised for the use of the public, are of any value in the early months, as compared with milk. Milk must be the basis. It is the really important part of the nutriment. It matters not greatly what be the feculent substance used, we think, if only the milk be good and in sufficient quantity, and the feculent material be in small proportion. To depend on amylaceous food is usually to sicken, and finally to starve the child. And yet we have found by experience that a small quantity of amylaceous material combined with the milk does render the food more digestible. We think that the opinion held by several physicians, that the particles of starch lessen the tendency of cow's milk to coagulate into hard large masses, by being interposed between the elements of the caseine, may be the correct one. At all events, experience, as stated above, has led us into the habit of using a small quantity. The following preparation was published in our first edition, twenty-one years ago: and we have employed it in a great many instances, and have found it the best substitute, as a rule, for the natural aliment, that we are acquainted with.

It is made by dissolving a small quantity of prepared gelatine or Russian isinglass in water, to which is added milk, cream, and a little arrowroot, or any other farinaceous substance that may be preferred. The mode of preparation and the proportions are as follows: A scruple of gelatine (or a piece two inches square of the flat cake in which it is sold) is soaked for a short time in cold water, and then boiled in half a pint of water until it dissolves,—about ten or fifteen minutes. To this is added, with constant stirring, and just at the termination of the boiling, the milk and arrowroot, the latter being previously mixed into a paste with a little cold water. After the addition of the milk and arrowroot, and just be fore the removal from the fire, the cream is poured in, and a moderate quantity of loaf sugar added. The proportions of milk, cream, and arrowroot must depend on the age and digestive power of the child. For a healthy infant within the month, we usually direct from three to four ounces of milk, half an ounce to an ounce of cream, and a teaspoonful of arrowroot to a half pint of water. For older children, the quantity of milk and cream should be gradually increased to a half or two-thirds milk, and from one to two ounces of cream. We seldom increase the quantity of gelatine or arrowroot.

We have given this food to a great many children during the last twenty years, as well to those brought up entirely by hand, as those partly suckled, or weaned, and can truly state that they have thriven better upon it than upon anything else we have employed. In several cases it has agreed perfectly well with infants who could not, without vomiting, diarrhœa, and colic, take plain milk and water, cream and water, any kind of farinaceous food prepared with water, chicken water, or in fact any other food that had been tried. In the cases of sick children, it ought sometimes to be made even weaker for a while than in the proportions first mentioned above.

We have been pleased to find that Dr. Routh (*loc. cit.*, p. 315) quotes, with great approval, a food recommended by Dr. Merei for feeble children, with bowels previously deranged, which is almost exactly the same as the above. Dr. Merei is one of the physicians of the Clinical Hospital for the Diseases of Children, in Manchester, and one who must, therefore, have had a large experience. He first makes a decoction of arrowroot with a teaspoonful of arrowroot to three-quarters of a pint of water, this quantity to serve for a whole day's supply. It is stated by Dr. Routh, that the arrowroot is not given as an aliment, but as a softish substance, to soothe mechanically the irritation of the intestinal mucous membrane. "Langenbeck, indeed," he says, "believes that in such cases the granules of starch intersperse themselves between the particles of casein, and thus in great measure prevent the formation of hard, indigestible curds." The mixture Dr. Merei gives, is stated to consist of three or four parts of this thin decoction of arrowroot, to one part of new milk, slightly boiled; and to the twenty-four hour's amount of food thus prepared, he adds about one or two tablespoonfuls of *cream*. Children, it is further stated, will digest well from a pint to a pint and a half of this mixture in twenty-four hours, according to their age. As they grow older, he increases the proportion of milk, but not of cream.

This is so much like our own preparation, recommended twenty-one years ago, that we feel strengthened in our own conviction as to its utility, particularly as the two experiences have occurred so far apart as England and America, and to persons who have reached the result by experience as well as theory.

There are other preparations, such as those of Dr. Frankland and Mr. Lobb, which may do well in some cases, but they are so complex, and require so much time, as to render them almost useless in the nursery. The one recommended by Baron Liebig, called Liebig's food, we have used occasionally, but have been disappointed in its action; and it, likewise, is so difficult of preparation, that we doubt its coming into general use in the nursery, where a food, to be well and properly prepared, must be simple.

The causes which compel us to resort to artificial food for young children, are, of course, very numerous. Thus, it may be impossible, after the death of the mother, to secure a reliable wet-nurse; or the mother's supply of milk may be manifestly insufficient; or, again, although the quantity is abundant, the milk either disagrees with the child, and causes vomiting and diarrhœa, or does not nourish it properly. In every case, therefore, where we have reason to suspect that the mother's milk is of improper quality, we should subject it to a careful examination; and, it is needless to add, that whenever a wet-nurse is chosen, a similar examination of her milk should invariably be made.

According to Vernois and Becquerel, who examined the milk of eighty-one nursing women, the composition of a healthy woman's milk is as follows:

1000 parts of milk contain—

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| Water, | 889.08 |
| Sugar, | 43.64 |
| Caseine, | 39.24 |
| Butter, | 26.66 |
| Salts, | 1.38 |

For practical purposes, however, it is quite sufficient for the physician to determine the specific gravity, the reaction, the amount of cream, and the microscopic appearances of the milk. The first three of these points are to be ascertained in the way already directed in the examination of cow's milk. The density of the milk should be about 1030 to 1032. The amount of cream, as tested by the graduated galactometer, should be at least three per cent. In regard to the reaction, our own observations are not in accordance with the statements of the majority of authors. Thus, according to Vogel (*op. cit.*, p. 32), a "fresh woman's milk is bluish-white or pure white, has a feebly sweetish taste, and *alkaline reaction.*" In order to determine this point, the following observations were made on forty-three women in the Philadelphia Hospital:

The subjects chosen were all in good health, and varied in age from nineteen to forty-one years. They were all suckling their own children, who were from nine weeks to eighteen months old, and, in three-fourths of the instances, in good health and well grown. In a good many cases the children had suffered more or less severely from diarrhœa during their teething.

The mode of testing was as follows: A few drachms of milk were first expressed from the nipple and rejected; a couple of drachms more were then expressed into a spoon, and tested with litmus and turmeric papers. In no instance was there the slightest alkaline reaction with the turmeric. In one instance only was there an acid reaction, and that a very faint one; while in forty-two of the forty-three cases, in nineteen of which the milk was tested twice, on successive days, the reaction was neutral.

It is necessary, in thus testing the milk, to express it into a spoon, since litmus paper is reddened when applied to the moist nipple.

It would appear, then, from these observations, that woman's milk can, at least, not be regarded as unhealthy on account of having a neutral reaction.

The microscopic examination should determine the quantity and size of the fat-globules, and the presence or absence of colostrum corpuscles.

The fat-globules, also called *milk-globules*, which are observed in healthy woman's milk, should not be very numerous, and should not vary in size more than from the 0.0012 to 0.0020 of an inch in diameter. The fat-globules, as present in milk, are invested with a delicate albuminous envelope. If the milk be allowed to stand, and the upper stratum of cream which forms be examined, along with the ordinary fat-globules, there will be numerous others of much larger size.

In addition to these fat-globules, there are also found in the milk during the first two or three weeks after confinement, a number of granule-cells, the so-called "*colostrum* corpuscles." These bodies, which present the ordinary appearances of granule-cells wherever found, consist of an aggregation of minute oil-globules in an albuminous basis; they vary from 0.003 to 0.006 of an inch in diameter; and when examined by transmitted light, appear opaque and dark-colored. After the period above mentioned (end of the second week), they should diminish rapidly in number, and only reappear in case the nursing woman is attacked with any acute febrile affection. If, therefore, they are found to persist long after the time mentioned, or if, having almost disappeared, they return in numbers, the milk must be regarded as unhealthy.

After these general remarks on the diet for hand-fed children, which we hope will not be thought too tedious, having regard to the great importance of this subject, not only in thrush, but in all the diseases of childhood, we return to the treatment of the special disease under consideration, thrush.

Few children, with thrush, unless the case be a very mild one, will take the full allowance of milk and water we have assumed to be necessary in the first weeks after birth. It is clear, however, that if the patient be taking only half a pint or a gill a day, it cannot live long on so much less than the natural quantity. It ought to take, under these circumstances, about two or three tablespoonfuls of food every two or three hours, between morning and evening, and once or twice in the night, which would amount to from eight to ten ounces in the day; and this quantity ought to be given if the child can be induced, without forcing, to take so much. If the usual proportion of two parts water to one of milk, or if the arrowroot and gelatine preparation above recommended, should be rejected in hard curds, or if masses of undigested curd be found in the stools, it is best, for a few days, to dilute with three or even four parts of the arrowroot solution, or to try for a short time, merely cream and water, one part of the former to three, four, or five, of the latter, returning to the mixture of cream, milk, and water, as soon as possible.

In mild cases of the disease, which have been caused by some temporarily unhealthy state of the nurse's milk, or, as we have seen it, from the occasional use of artificial food to eke out a diminished supply on the part of the nurse; after regulating the diet as directed, the use of the following mixture, which we have employed for many years past, will often prove very successful and tranquillizing:

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|---|---|
| ℞.—Sodæ Bicarb., . . . . . . | ʒss. |
| Tr. Opii Camph., . . . . . . | gtt. xl. |
| Tr. Rhei, . . . . . . . | gtt. lxxx. |
| Syrup. Simp., . . . . . . | fʒij. |
| Aq. Menth, . . . . . . . | fʒxiv.—M. |

A teaspoonful three times a day.

This dose, continued for several days, or even weeks, will, unless the cause continue in force, relieve the pain and wakefulness, lessen the diarrhœa, and greatly promote the comfort of the child. In connection with this, the mouth should be touched, once or twice a day, with a solution of nitrate of silver, of one grain to the ounce.

In the *grave form* of the disease it is necessary, after regulating the diet, to employ remedies for the disordered condition of the alimentary canal. These should consist principally of alkalies, astringents, opiates, occasionally a dose of some laxative substance, nitrate of silver, and the external employment of baths, warm cataplasms to the abdomen, and sometimes of revulsives.

The *alkalies* usually employed are soda, lime-water, magnesia, chalk, and prepared crab's-eyes. Of these we prefer, in most cases, the soda, lime-water, chalk, or crab's-eyes, to be given in the manner which will be recommended in the article on entero-colitis. Dewees recommends very highly the following formula:

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|---|---|
| ℞.—Magnes. Alb. Ust., . . . . . . | gr. xij. |
| Tinct Thebaic., . . . . . . | gtt. iij. |
| Sacch. Alb., . . . . . . . | q. s. |
| Aquæ Font., . . . . . . . | f℥j.—M. |

A teaspoonful to be given every two hours until the bowels are tranquil.

He says of it that he has "long adopted it with entire success." In conjunction with the internal use of alkalies and astringents, we would recommend the practice pursued by M. Valleix of employing *opiate enemata* and warm *poultices* containing laudanum, applied upon the abdomen. The enemata should consist of one drop of laudanum in a tablespoonful of starch-water for young infants, to be used morning and evening. The poultices may be made of Indian or flaxseed meal, placed between two pieces of soft gauze flannel, to be secured around the body by a band and renewed from time to time.

*Purgative remedies* are much used in this country in all cases of intestinal disorder. We believe them to be unnecessary, and generally in-rious, in thrush, except at the onset, and occasionally through the course of the disease, when we may suppose the bowels to contain accumulations of partially digested aliment, or highly irritating secretions. Under these circumstances, and only then, from half a teaspoonful to a teaspoonful of castor oil, or a teaspoonful of spiced syrup of rhubarb, containing half a drop of laudanum, may be prescribed, and repeated in case the same condition of things should recur. When once the diarrhœa with green watery stools is established, we believe all cathartics to be, as a rule, injurious.

*Opiates*, in moderate quantities, given in combination with alkalies or astringents, or used by injection or externally, are of the greatest service at all stages of the grave form of the disease. When the diarrhœa is severe and obstinate, and particularly when the stools contain mucus or blood, or are attended with tenesmic straining, nitrate of silver given internally, and used by injection, may be resorted to with very probable benefit. The doses and modes of administration will be described under the heads of entero-colitis and dysentery.

Some authors recommend the application of one or two leeches to the margin of the anus, or over the left iliac fossa. We think they can rarely be proper, and if so, only in vigorous, hearty children, and in cases presenting strongly marked inflammatory symptoms. When the symptoms indicate great exhaustion, or tend towards a state of collapse, resort must be had to stimulants, of which the best are weak brandy and water, or a mixture of equal parts of wine-whey and arrowroot water.

LOCAL TREATMENT.—The local treatment is important in all cases, but is of much less consequence than the general treatment, and particularly attention to the diet and other hygienic conditions of the patient. Topical remedies undoubtedly have the effect, however, in some instances, of arresting the progress of the exudation, and hastening the resolution of the disease of the mouth; but we have uniformly found, in grave cases, that no remedies applied to the mouth had any decided influence upon the abdominal disease, which is, after all, the cause of the fatal termination in the vast majority of cases. The local treatment ought, therefore, to be regarded as adjuvant only to the general management of the disorder.

In mild cases the most suitable local treatment, the one recommended by Underwood, Dewees, Eberle, and MM. Trousseau and Delpech, and that which we have generally employed, is the occasional application to the mouth of borax. It may be used mixed with an equal quantity of honey, and applied by means of a rag or pencil; or with an equal quantity or two parts of finely-powdered white sugar, of which a pinch is to be put upon the tongue every two or three hours; or in solution, in the proportion of a drachm to two ounces of water. The best mode probably is to mix it with honey. If this application fail to arrest the deposit of the exudation, we may resort to alum in powder or solution, or, better still, to solutions of nitrate of silver, or to careful cauterization with the solid nitrate. The alum may be used in the same manner as borax, or according to the following formula, recommended by M. Valleix:

℞.—Aluminis, . . . . . . . gr. xv.
Mel Rosæ, . . . . . . . ʒijss.
Decoct. Hordei, . . . . . . f℥iijss.—M.

In the use of the nitrate of silver, we should resort to a solution of five grains to the ounce of water. MM. Trousseau and Delpech, however, employ one of thirty grains to the half ounce, or more frequently cauterize lightly the whole mucous surface with the solid caustic.

Between the application of any of the above-mentioned remedies, the mouth of the infant ought to be occasionally moistened and cleansed with some of the mucilaginous solutions, as gum-water, flaxseed tea, or that made from sassafras pith, slippery elm bark, or marsh-mallow root.

Strict and careful attention must be constantly paid to the state of the skin around the anus, and upon the thighs and buttocks. These parts ought to be well cleansed, after each evacuation of urine or stool, by gentle pressure, and not by rubbing, with a fine sponge dipped into tepid milk and water, then dried with a soft napkin in the same manner, and well anointed with simple cerate, or, what we find better than anything else, Goulard's cerate. These precautions ought to be still more carefully observed if erythema has already made its appearance.

## ARTICLE VI.

### SIMPLE OR ERYTHEMATOUS PHARYNGITIS.

DEFINITION; SYNONYMES; FREQUENCY.—Simple pharyngitis consists of an erythematous inflammation of the pharynx, tonsils, and soft palate, unaccompanied by ulceration, deposit of false membrane, or gangrene. It is not mentioned by Underwood. It is described under the title of cynanche tonsillaris by Dewees and Eberle, and of tonsillitis by Stewart and Condie. It is very frequent both as an idiopathic and secondary disease. We constantly meet with it in children of all ages during the cold months of the year.

CAUSES.—It may occur at all ages, and is equally common in the two sexes. It is more frequently a secondary than an idiopathic affection. The diseases in the course of which it is most apt to occur are scarlet fever and measles, and next pneumonia and bronchitis. It is often an accompaniment of simple laryngitis. The idiopathic form is most common in this city in the late winter and early spring months. It is said to prevail sometimes in an epidemic form.

The *exciting causes* of the disease are not always easily detected. In most instances, however, we believe that exposure to cold is the cause of the attack.

ANATOMICAL LESIONS.—In mild cases the alterations of texture observed during life, and in a few instances after death, the patient having died of some other disease, consist of greater or less redness, swelling, softening, and a rough or granular and sometimes œdematous condition of the mucous membrane covering the soft palate, tonsils, and pharynx. The uvula and tonsils are generally tumefied, and the crypts of the latter filled with mucous or purulent fluid of a yellowish color. In one very severe case which proved fatal, MM. Rilliet and Barthez found the tonsils very red, soft, only slightly swelled, and infiltrated with pus; the pharynx was covered with a thick layer of bloody mucus; the mucous membrane of the throat was of a dark red color, thickened, and granular, but not softened. The submaxillary glands were of a grayish color, enlarged and soft.

SYMPTOMS.—Simple pharyngitis of moderate severity begins with restlessness, irritability, fever, slight cough, and in some instances, pain in the throat, which is complained of by older children, and betrayed in those who are very young, by the refusal to nurse or take food, because of the difficulty of swallowing. The *face* is generally flushed, sometimes very deeply so. Young children are often drowsy, but from irritability and fever refuse to sleep except on the lap. The *fever* is marked by acceleration of the pulse, which rises to 100, 110, or more in children over five years of age, and to 120, 130, or 140 in those under that age, and by unusual warmth or even heat of the skin. At the same time the *respiration* is generally more frequent than natural, but almost always regular; in cases attended with high fever, we have counted the breathing at 42 and 50. *Auscultation* reveals pure vesicular murmur or slight sibilant rhonchus. The *voice* is clear, or, in rather severer cases, obscured and nasal, and in some instances, speaking is painful and difficult. *Cough* is a frequent symptom. It was present in 20 of 25 cases observed by ourselves. In 6 of these it was harsh and croupal, so that the children seemed threatened with croup. The croupal sound seldom lasted over one night, after which the cough was merely hoarse, and gradually became loose towards the termination of the attack. In the remaining cases it was rare and dry in the beginning, and more frequent and looser as the disease progressed. *Pain* is a frequent, but far from constant symptom at the outset of the disease. It generally exists during deglutition. When present it is shown in infants, as stated, by their refusing the breast, or nursing only at long intervals, and with difficulty; while in older children it is complained of. It is not, however, a constant symptom, as we have often seen children of one, two, and three years old, with severe angina productive of violent fever, who swallowed fluids and soft solids without a sign of pain. Of 22 cases in which the state of this symptom was particularly noticed by ourselves, it was present only in 7. Throughout the acute period of the disease there is generally considerable *thirst;* the *appetite* is diminished or entirely suppressed; the *stools* are usually natural, or there is slight constipation.

The throat should always be examined when there is the least reason to suspect that an attack of sickness depends upon inflammation of that part, and whenever a child has been seized suddenly with fever, particularly in cold weather, and there is nothing more evident by which to ex-nervous system dependent upon dentition. The only method of ascertaining the truth is again the inspection of the throat. Cases of this kind might also be mistaken for the beginning of scarlet fever. Time only, and the development or absence of the symptoms peculiar to the latter disease, could enable us to determine the diagnosis.

The diagnosis between simple and pseudo-membranous pharyngitis will be given under the head of diphtheria.

PROGNOSIS.—Simple pharyngitis of moderate severity is very rarely, if ever, a fatal disease. Severe or grave erythematous pharyngitis, on the contrary, is often a dangerous malady. The four cases that have come under our care, however, all recovered. The unfavorable symptoms in such cases are: very violent fever, greatly altered physiognomy, difficult respiration, choked and guttural voice, excessive jactitation, delirium, convulsions, and coma.

TREATMENT.—Mild cases of simple angina need but little treatment. The child ought to be confined to a warm room in all cases, and kept in bed, or on the lap, if it have fever. The diet must be restricted to milk preparations and bread, so long as the fever continues. The therapeutical part of the treatment may consist in the use of some mild evacuant, as one or two teaspoonfuls of castor oil, half a teaspoonful or a teaspoonful of magnesia, a small quantity of syrup of rhubarb, or what is all-sufficient in many cases, a simple enema. At the same time we may give, if the frequency of pulse, heat of skin, and restlessness be considerable, a few doses of spirit of nitrous ether, or spiritus Mindereri, alone, or combined with from one to four drops of antimonial wine, according to the age. A warm bath, if the child is not afraid of it, is an admirable remedy when there is much excitement of the circulation; or a foot-bath, containing salt or mustard, may be used. Frictions over the throat and neck are often very advantageous; they may be made with hartshorn and sweet oil, with or without the addition of laudanum, or a small quantity of spirit of turpentine may be applied upon the skin, so as to produce slight counter-irritation. When there is much pain and difficulty of deglutition, the case is best treated by the use of nitrate of silver in solution (5 or 10 grains to the ounce), or of powdered alum, applied by means of a large throat-brush.

In the *severe form* of the disease the treatment must be much more active than in mild cases. When the fever is very high, and threatening nervous symptoms are present, the most speedy means of controlling them is a warm bath, continued for fifteen or twenty minutes. If the effects of this should be slight or transitory, one or two leeches may be applied behind the angles of the jaw, unless the fright and consequent resistance on the part of the child are so great as to render their application objectionable. Some evacuant dose should be given early in the attack; it may consist of castor oil, magnesia, epsom salts dissolved in lemonade, fluid extract of senna, or infusion of senna and manna. The quantity must be sufficient to produce several copious stools, and should it fail to operate in three or four hours, and the fever continue, it is always well to assist it by means of a purgative enema. Two hours after the exhibition of the cathartic, it will be proper to resort to small doses of antimonial wine, with nitre, repeated every hour and a half or two hours, in the manner recommended in the article on pneumonia. If the secretions into the fauces be very abundant and tenacious, so as to impede respiration, the best means of getting rid of them is by an emetic of ipecacuanha, hive syrup, or antimonial wine. If they collect again, the throat ought to be cleansed from time to time with a small sponge-mop. The inflamed surfaces should be touched two or three times a day with a solution of nitrate of silver (from five to ten grains to the ounce). The late Dr. C. D. Meigs was in the habit of employing with much benefit, in the severe angina of children, whether idiopathic or secondary, a wash made according to the following formula:

℞.—Cupri Sulphat.,
Quiniæ Sulphat., āā, . . . . . . gr. vj.
Aquæ Destillatæ, . . . . . . f℥j.—M.

This is applied in the same way as the lunar caustic solution, and we have frequently seen it produce most excellent effects.

The four grave cases observed by ourselves recovered under very simple treatment. This consisted in the use of the warm bath, of doses of castor oil to move the bowels freely on the first day, and of syrup of rhubarb or enemata afterwards to keep them soluble; of doses of antimonial wine and nitre every two hours in such quantity as to avoid sickness; of mustard foot-baths; stimulating frictions to the outside of the throat; applications of lunar caustic solution to the throat internally, three or four times a day; and of rigid diet. In one case the warm bath was used three times in a single day, because of the extreme restlessness and heat of the skin, and was productive each time of much benefit.

# CHAPTER II.

## DISEASES OF THE STOMACH AND INTESTINES.

### GENERAL REMARKS.

In our division of these diseases, we shall treat first of Indigestion, using this term to signify morbid conditions of the digestive function, which we suppose to be the result of functional disorder, or of mild, acute or chronic catarrh of the stomach. Under the title of Gastritis we shall describe the much more rare and dangerous form of disease, in which there is acute inflammation of one or more of the coats of the stomach, and which is seldom met with except as the consequence of the application of some direct irritant to the organ.

We shall then describe Simple Diarrhœa, in which we suppose the intestinal disorder to be either merely functional, or one of slight catarrhal inflammation of the mucous membrane. Next, under the title of Entero-colitis or Inflammatory Diarrhœa, we shall treat of that form of diarrhœa which is now by many writers styled acute or chronic catarrh of the intestinal mucous membrane, and the chronic forms of which we believe to be of the same nature as the disease designated by most of the observers whose experience was gathered in the vast field of the late war, chronic diarrhœa. We shall pass on then to Cholera Infantum, limiting this term to cases in which the disease is of a true choleraic type; and, lastly, we shall consider Dysentery. We have also added separate articles on the diseases of the Cœcum and Appendix Vermiformis, and upon Intussusception.

## SECTION I.

### FUNCTIONAL DISEASES OR MILD CATARRH OF THE STOMACH AND INTESTINES.

## ARTICLE I.

### INDIGESTION.

Definition; Frequency; Forms.—By the term indigestion, we mean that condition of the stomach in which its function of digestion is disturbed or suspended, independent of inflammation or other disease of the organ, appreciable by our senses; or in which there has been found after death, in the few opportunities that have been met with to make such an investigation, the lesions which are now usually designated as mild gastric catarrh. The only anatomical alterations found in such cases, are reddening of the mucous membrane in spots by a fine injection, relaxation of its tissue, and the presence of a layer of tough mucus. It is a very frequent affection during the whole period of childhood, and is one of great importance on this account, and from the fact of its laying the constitution open, by the debility and cachexia which it produces, to various secondary affections. In our description of the disease, we shall distinguish between the forms which occur during infancy, and after the completion of the first dentition.

Causes.—The principal causes of indigestion in infants are an unhealthy state of the milk of the nurse, the use of artificial diet, and lastly, an impaired condition of the digestive function, which disables the stomach from digesting even the most healthful aliment.

The milk of the nurse may be too old for the child, for it has been found that a breast several months old, sometimes, though not always, disagrees with a young infant, in consequence, no doubt, of the milk being thicker and richer at that time than immediately after parturition. The breast-glands may continue to secrete colostrum for weeks or even months after parturition, and when this is the case the child is almost sure to suffer from indigestion and diarrhœa. The milk may be unwholesome because the nurse is in bad health, or because her diet is not properly regulated. That the diet of the nurse affects her milk, we have no doubt, though it has been denied by some persons.

We have known several children to suffer from indigestion, attended with vomiting, acid secretions, colic, and diarrhœa, in consequence of the nurse having indulged in a very rich diet, and particularly in vegetables and fruits. We do not mean to assert that all nursing-women should abstain from fruits, or even live on a very simple diet, for we have known some who could make use of the richest food, and eat abundantly of all kinds of vegetables and fruits, without the least injury to the child. But there are others who cannot do so without occasioning indigestion in their infants, because, probably, their children are unusually susceptible to the action of the materials absorbed from that kind of food. Again, it is clearly proved by recorded cases and by the opinions of various authorities, that the milk of the nurse is affected by her moral condition. Children have been known to suffer greatly, and even to die, from taking the milk of a nurse who had just before undergone a fit of violent anger. The depressing moral emotions, as anxiety, grief, fear, and despair, are well known to affect the milk secretion in such a way as sometimes to occasion indigestion.

The use of artificial diet for young infants, or as the expression is, "bringing up on hand or the bottle," is, we believe, by far the most frequent cause of indigestion during infancy. Very many children with whom this is attempted, die of indigestions, chronic diarrhœas, gastritis, entero-colitis, cholera infantum, and thrush. Very few escape frequent attacks of one or other of the diseases just named. Much depends, no doubt, on the selection and preparation of the food. It may be stated as a well-established fact, that a diet consisting wholly or in a great part of farinaceous substances, very rarely fails to disagree with the child, and to produce indigestion and other disorders of the digestive system, which often prove fatal; while one in which cow's or goat's milk enters as the principal ingredient, though inferior to the natural aliment, and often productive of indigestion, is far less injurious than the one before spoken of.

A third cause of indigestion was stated to be the absence or loss of the digestive power of the stomach, independent of the nature of the food. This is a condition similar to the dyspepsia of the adult. It may be congenital or may result from causes brought into action after birth. It often remains as a consequence of previous indigestions from improper or excessive feeding. It exists during the invasion, course, and convalescence of various diseases. Dentition frequently diminishes or impairs the tone of the digestive function, so that the child is often unable, during that process, to digest aliment which had agreed with it perfectly well at other times.

The causes of indigestion after the completion of the first dentition are congenital feebleness of the digestive function; a certain want of power of that function, which remains often for years in children reared upon artificial diet, and in those who have been debilitated by frequent attacks of disease of any kind; the habitual use of improper diet; the eating of crude, indigestible food; the process of the second dentition; the want of due exercise in the open air; residence in large cities; and undue exercise of the mental faculties in the conduct of the education of the child.

SYMPTOMS.—We shall describe first the symptoms of indigestion as it occurs during infancy, and secondly as it occurs during childhood, or after the completion of the first dentition.

Indigestion during infancy may be advantageously considered under two heads: as occasional or accidental, and as habitual. By the former we mean that which occurs in a healthy infant from a transient cause, such as repletion or a momentarily unhealthy state of the nurse's milk from some imprudence on her part as to diet, from some moral cause, or from sickness; and that which depends upon the passing influence of dentition. By habitual indigestion, we mean the form of the affection which is long continued in consequence of a persistence of the cause.

The symptoms of *occasional* or *accidental* indigestion in infants are: paleness and contraction of the face; restlessness and peevishness; moaning and crying, or in some cases, screaming; nausea, shown by excessive paleness, often by very great languor, and by occasional retching, which may either subside without vomiting, or as more frequently happens, terminate in that act; flatulent distension and hardness of the abdomen, especially in the epigastric region, often accompanied with eructations; and in many of the cases simple diarrhœa. These symptoms usually come on soon after nursing freely, or after a very hearty meal of artificial food, in a child previously in good health. The attack seldom lasts more than a few hours or one or two days. The vomiting which almost always takes place, and which relieves the stomach from the offending cause, very often accomplishes the cure.

*Habitual indigestion* in infants causes a train of symptoms which are different from, and much more severe than those just described. Of these the most important are: frequent attacks of nausea and vomiting, and of simple diarrhœa repeated for days, weeks, or months in succession; paleness, or some other unhealthy tint of the cutaneous surface; continual restlessness and discomfort, with fretting or crying, particularly in the after-part of the day and during the evening and night, in place of the natural ease and quiet of a healthy infant; constant fits of the most violent screaming from colic, sometimes lasting for hours; dull and languid expression of the countenance, or else an uneasy, contracted look, like that produced by continued suffering; more or less emaciation; failure of the natural growth in stature and size, so that the child is small and puny for its age; want of calorific power, causing the child to suffer unusually from cold, as shown by frequent coolness of the hands and feet; irregular appetite, which makes it necessary to tempt by frequent changes of the food, or more or less complete anorexia; and lastly, the various symptoms that indicate an impoverished state of the blood and bad nutrition.

In some cases there are added to the above symptoms, or there follow as a consequence of the indigestion, those of gastritis or entero-colitis, to be hereafter described. Indigestion probably seldom proves fatal in infants, except from the occurrence of some inflammatory complication, as by turning and rolling, by moaning or crying out, and by grinding of the teeth. These latter symptoms, together with picking at the nose, which is a frequent accompaniment, are almost always referred by the parents and nurses to worms, and it is often impossible to convince them to the contrary, even though frequent and violent doses of vermifuges have failed to show the existence of entozoa. The state of the bowels is uncertain. In some instances they are very much constipated, requiring frequent doses of laxatives, or careful regulation of the diet, to keep them soluble: in others they are inclined to be loose, and when this happens, the stools are often lienteric. In others, again, constipation and diarrhœa alternate. The abdomen is usually natural, or somewhat enlarged from flatulent distension; complaints of pain are not uncommon. This form of indigestion, like dyspepsia in the adult, is generally a very chronic affection, seldom lasting less than several weeks or months, and sometimes persisting for years.

Diagnosis.—The occasional indigestion of infants is not likely to be mistaken for any other complaint. The suddenness of the attack, the character and quantity of the matters ejected from the stomach, the absence of symptoms indicating the invasion of any other disorder, the short duration of the symptoms, and the rapid recovery, all render the true nature of the case very clear. That which occurs in older children, on the contrary, is not so easy of diagnosis. In many cases the invasion is not unlike that of scarlet fever. The vomiting, the rapidity of the pulse, the great heat of the skin, and in some cases a certain suffusion of the integument dependent on the activity of the circulation, all render the case doubtful for some hours, or for a day, after which time the difficulty ceases, from the development of the symptoms peculiar to the disorder. We believe that not a few cases of simple angina are mistaken for indigestion, owing to the absence of complaints of sore throat, and the neglect of the physician to examine that part. In such cases the [illegible] the physical and rational signs, of all the important organs of the body, as it sometimes happens that latent disease of some one of them is the cause of the gastric difficulty.

PROGNOSIS.—The prognosis of occasional indigestion is nearly always favorable. It is rarely a dangerous disorder, unless accompanied by convulsions, or some other sign of violent disturbance of the nervous system. Under the latter circumstances, the prognosis should be very cautious, as the termination is not unfrequently fatal in consequence of injury done to the nervous centres. It should be recollected also that this form of indigestion sometimes becomes the exciting cause of inflammation of the stomach or intestines, in which event the prognosis will be that of those diseases.

Habitual indigestion in infants is a serious complaint, and ought always to awaken the solicitude both of the physician and parents; for though a simple functional disease of the stomach is not probably often fatal, it is exceedingly apt to prove so by the induction of gastritis, chronic enteritis, entero-colitis, or thrush, or by its laying the system open to other diseases, and rendering it less able to withstand them should they happen to occur. In older children it is not, according to our experience, so dangerous a malady. We have never, as yet, seen it terminate fatally.

TREATMENT.—The treatment of *occasional indigestion* in infants ought to be very simple. The child has generally relieved itself by vomiting before the physician is called. If, however, it continues pale and languid, with vomiting or retching, after the stomach seems to have been emptied, the proper plan is to make use of remedies to calm the irritability of that organ. This can almost always be accomplished by giving a teaspoonful every ten or fifteen minutes of a mixture of lime-water and milk, consisting of one-third milk to two-thirds lime-water, or of equal proportions of each, or the same doses of a mixture consisting of equal parts of lime-water and cinnamon-water. At the same time a small mustard plaster, weakened with wheat flour, or flannels wrung out of hot brandy and water, may be applied to the epigastrium, or a warm Indian mush poultice, in a flannel bag, laid over the whole abdomen. Should these means fail to relieve the sickness, from half a drop to a drop of laudanum, or ten drops of paregoric, may be administered, and repeated, if necessary, in two hours. The child generally recovers its usual health after the sickness has entirely ceased. If, however, it remain fretful and uneasy, if it cry much as though in pain, it is probable that a portion of aliment has passed, in a partially or wholly undigested state, into the intestine. The suspicion will be confirmed if the abdomen is found, upon palpation and percussion, to be swelled, hard, and resonant from flatulent collections in the bowels. Under these circumstances, a laxative ought to be given. The best dose is half a teaspoonful or a teaspoonful of castor oil, a teaspoonful of simple or spiced syrup of rhubarb, or, if there have been evidences of an acid state of the stomach, about a quarter of a teaspoonful of the best magnesia.

The *occasional indigestion* of older children demands a different and more energetic treatment. After ascertaining that the child has eat something indigestible, we should inquire whether there has been vom ing. If there has been none, or if only slight, it will be proper to g an emetic immediately. The best one under the circumstances is ipec uanha. This rarely fails to produce a full effect, and does not perturb the system, or irritate the stomach, like tartar émetic. It may be giv either in powder or syrup. The dose is familiar to every one. If t ipecacuanha be not at hand, we may use hive syrup, which is kept in most every house, or a teaspoonful of powdered alum in honey or m lasses, to be repeated, if necessary, in fifteen minutes. Alum is less a to fail than either ipecacuanha or hive syrup. If the child continue u well after the operation of the emetic, which is often the case, and p ticularly if the fever be considerable, a purgative should be given as so as the stomach will bear it. The best dose is castor oil, which is the mo speedy and least irritating. It may be given in orange juice, which form an excellent vehicle, or, if the child is old enough, in the froth of beer porter. A dessert-spoonful is generally enough. If the oil cannot taken, we may give infusion of senna and manna, the fluid extract senna mixed with spiced syrup of rhubarb, syrup of rhubarb alone, ma nesia, to be followed by lemonade, salts and magnesia, or the form alone, or, lastly, a seidlitz powder. If the fever continue, and the c thartic fail to operate in four or six hours, a purgative enema ought to given to hasten its effect. A bath at about 96° or 97° will almost alwa be found useful in these cases. The child should be kept in the bath fro eight to twelve or fifteen minutes. The only circumstances which form an objection to this remedy are the facts of the patient being so irritable or so fearful of the water, as to make it necessary to contend with hi in order to succeed in using it. When this is the case, it had better no be employed, and sponging with tepid water and spirit should be subst tuted. If the child complains of pain in the stomach, the application o a warm mush poultice over the epigastrium or whole abdomen will be found of much service.

When, in this form of indigestion, the febrile reaction is violent, as it often is, and particularly when there are signs of great disturbance of the nervous system, consisting of excessive agitation, complaints of severe headache, drowsiness, moaning or crying out in the sleep, or twitching and jerking of the muscles, the physician should beware of a convulsive attack. In such cases as these, the patient ought to take a purgative dose of calomel (from two to three grains), or a dessert-spoonful of castor oil, have a warm bath at once, and soon after an injection. The remedies ought to be prompt and energetic, for the case is pressing. A convulsion is always a dangerous event in childhood, and should be prevented if pos sible. If calomel has been given, a cathartic dose ought to be adminis tered about two hours afterwards, in order to insure an action upon the bowels, and to carry the calomel out of the system. These means rarely fail to afford relief in a few hours. The diet should be absolute during the violent stages of the attack, and the usual diet is to be resumed only by degrees. The drinks may be plain water or gum-water, taken cold.

It not unfrequently happens that occasional indigestion is followed by gastritis or enteritis, or by habitual indigestion lasting for weeks or even months. These different sequelæ must be treated according to the plan proper for each.

The *habitual indigestion* of both infants and older children, requires a very different treatment from the occasional or accidental form. In both the indications are nearly the same. The most important are very careful regulation of the diet in all its details, the use of tonics and stimulants to restore tone and vigor to the digestive function, the employment of remedies to correct the state of the bowels, whether they be relaxed or constipated, and attention to securing the child proper exercise, exposure to the air, and suitable clothing.

If the symptoms of the disorder occur in a child at the breast, the milk of the nurse should be carefully examined, in order to ascertain whether it be good. If found to possess any unhealthy qualities, the nurse ought to be changed at once. Attention to this point alone will almost certainly cure the child. It needs no other remedy.

If the patient is fed wholly or in part, it is essential to regulate the diet to suit the state of the digestive function. Milk ought in all cases to form the basis of the food, unless it has been found by patient trial to be absolutely repugnant to the stomach. We have often found that infants who had been thought quite incapable of digesting cow's milk, could do so very readily when it was very much weakened with water. The usual proportions for an infant of a few months old, are half and half, or two parts milk for one of water. When these are found to disagree, it is well to try three, or even four or five parts of water to one of milk, and if the stomach digest this, as it often will, the proportion of milk may be slowly and cautiously increased to the usual standard. If we conclude that milk cannot be digested by the child, it is best to try cream. Of this, one part to three or four of water, may be given. When neither of these can be taken, some of the farinaceous substances may be tried; arrowroot, sago, barley, tapioca, oatmeal, or rice. We are clearly of opinion, however, that these articles prepared with water alone, never agree with children when they are continued for any considerable length of time. Some infants of six or eight months old, it may be remarked, who cannot digest more than very small quantities of milk, will take and digest well, very delicate broths made of chicken or mutton, or small quantities of the lightest meats, as mutton, chicken, or very tender beef, minced up extremely fine, and given by teaspoonfuls.

In cases of this kind we have found a diet consisting of gelatine, milk, cream, and arrowroot, prepared in the manner directed in the article on thrush (see p. 304), to suit better than anything else. We have met with several children, and with two in particular, whom it was necessary to feed to the amount of a pint or a pint and a half a day, in addition to their being nursed occasionally, who could take neither milk and water, cream and water, milk and arrowroot, oatmeal gruel, rice gruel, nor indeed anything that was tried, without vomiting, colic, and severe diarrhœa, who digested perfectly well and throve admirably upon the preparation latter is necessary in order to sustain the strength of the child, and allo it to carry on its growth. We have generally found it most prudent, an often really necessary, to specify as to the substances to be given at eac meal. The morning and evening meal ought to consist of bread and mil mush and milk, or of milk, warm water and sugar (called in this countr children's or cambric tea), and bread and butter, and nothing else i most of the cases. It is sometimes proper to allow a soft-boiled egg particularly if the child be very fond of it. The dinner ought to consis of light broths containing rice, with bread or toast, or of the plain meats as mutton, beef, chicken, turkey, birds, or fine game. No vegetable ough to be allowed in most of the cases except rice, as all others, even the potato are very apt to disagree. We believe that the potato is more digestibl when roasted than when boiled. If the child require anything betwee breakfast and dinner, it may have what is allowed at breakfast, or dry bread and nothing else. There are various articles of diet which should be absolutely forbidden, amongst which are hot and sweet cakes, and hot bread of all kinds; sausages, not unfrequently given to children in this country; corn-beef, ham, veal, pork, goose, ducks, fish; all manner of dessert, excepting rice-pudding, or curds-and-whey, often called junket; sweetmeats, candies, fruits, except some of our finest summer ones; and to conclude, everything which long observation and experience have shown to be unsuitable to a dyspeptic stomach.

It is sometimes very difficult to find anything to agree well with the child. In one case of a child three years old that came under our observation, neither milk, bread, nor meat, could be taken. The caseine of milk seemed to be absolutely indigestible, as it would be rejected from the stomach many hours, or even a day or two after the milk had been taken, in the form of masses of dry, fibrous cheese, of an oblong shape nearly or quite as large as a peach-stone. After trying various articles ture, by anodyne enemata given once or twice a day, by the aromatic syrup of galls (to be described under the head of entero-colitis), or by some of the astringents in common use.

In all cases of chronic indigestion in children, it ought to be regarded as an essential part of the treatment to secure to the patient a proper amount of exercise in the open air. In summer the child should pass several hours of every day in the air. It ought, indeed, if the heat of the sun can be avoided by proper shade, to pass the whole day in this way. In winter it is, of course, impossible to carry this system to the same extent, but the child should nevertheless be taken out at least once a day: this may be done in the coldest, and even in damp weather, if sufficient clothing be worn. If a child comes back from a walk with warm limbs, and with its cheeks in a glow, there is little danger of cold. The quantity of clothing must depend on the constitution and idiosyncrasy of the patient. Some need twice as much as others. The proper amount is best determined by the temperature and coloration of the surface after a walk.

## ARTICLE II.

### SIMPLE DIARRHŒA.

Under this title we shall describe a mild form of diarrhœa to which children are very subject, in which the pathological condition appears to be one of mere functional disorder, or of very moderate hyperæmia or catarrh of the intestinal mucous membrane. We might, indeed, assume, with some, that the disorder is at all times one of mild catarrh of the bowels, but we deem it best, in a practical point of view, to consider it as being sometimes one of functional disturbance only, since many observers of high authority declare that they meet with cases of even fatal diarrhœa in which no anatomical alterations are found after death, and since we ourselves have met with so many cases in practice which follow a different course in symptomatology, duration, and their effects upon the constitution, from the form of disease which we shall treat of as entero-colitis or inflammatory diarrhœa.

CAUSES.—The causes of the disease during infancy are *unfavorable hygienic conditions*, as the habitation of unwholesome, ill-ventilated, damp, and filthy dwellings, or of contracted and crowded quarters of cities and towns; an *unhealthy state of the milk* of the nurse; the use of *artificial diet* at too early an age, especially that of an improper kind; *cold; dentition;* and lastly, great *atmospheric heats*. The most important of these are improper alimentation, by which we mean the use of artificial diet, and particularly one consisting chiefly of farinaceous substances to the exclusion of a proper amount of milk, and dentition. For a fuller account of the influence of these different circumstances on the digestive organs of children, the reader is referred to the remarks on the causes of entero-colitis, and to the article on thrush.

The chief causes of the disease after the first dentition are, according to our experience: the habitual use of *improper food;* the *loss* of digestive power, which often follows a severe indigestion, or an attack of some acute disease; the *debility of constitution* which attends sudden and rapid growth; the *want* of proper exercise and exposure to the air; the predisposition which exists in some children from *hereditary* causes; and the disturbing influence of the *second dentition.*

The system of indiscriminate diet allowed to children in this country is, it seems to us, a fruitful cause of gastric and intestinal complaints. We believe that, as a general rule, children over two and three years of age, are allowed amongst us to eat of the food prepared for the older members of the family. Now, any one who will reflect upon the variety of dishes habitually placed upon an American table, ought not to be surprised to see children permitted a choice amidst such profusion, pale, thin, delicate, exposed to frequent indigestions, attacks of diarrhœa, and entero-colitis, to gastric fevers, and the host of minor ills attendant upon feeble digestive powers. We are acquainted with some families in this city, the children of which, from the age of two years, are allowed habitually to breakfast upon hot rolls and butter, hot buckwheat cakes, hot Indian cakes, rice cakes, sausages, salt fish, ham, or dried beef, and coffee or tea; and to dine upon a choice of various meats and a great variety of vegetables, which latter they often prefer to the exclusion of meat, and then to make a rich dessert of pies, puddings, preserves, or fruits; and lastly to make an evening meal of tea and bread and butter, almost always relished, as the term is, with preserves, stewed fruits, hot cakes of some kind, or with radishes, cucumbers, or some similar dish. Add to such meals as the above, the eating between whiles of all kinds of candies and comfits, which many children here regularly expect in larger or smaller quantity, cakes both rich and plain, fruits to excess and at all hours, from soon after breakfast to just before going to bed, raisins and almonds, and nuts of various kinds, and the wonder is, not that we are a pale, thin, dyspeptic, and anxious-looking race of people, compared with Europeans, but that we have any health at all, when our children are allowed to make use of the indiscriminate and unwholesome diet just described. Such a system undoubtedly occasions frequent attacks of the disease under consideration, and unless the diet be changed early in the attack, it is very apt to become chronic. It has been stated that simple diarrhœa sometimes followed as a consequence of indigestion. We have known such a result to occur in children previously in fine health, and to continue for several weeks or months. In these instances, the disorder appears to depend in good measure on the loss of the digestive power of the stomach. This seems proved by the great influence which the character of the food has upon the malady, which is always aggravated by the use of any articles except those universally acknowledged to be the most digestible, and also by the frequent coexistence of lientery when the food is not of the lightest kind.

We have several times met with cases which we could ascribe to no other cause than debility and want of power of the digestive organs, dependent upon too rapid growth. That sudden and rapid growth may produce feeble digestion, or, in other words, a dyspeptic state, is, in our opinion, proved by the following consideration. It is attended with loss of appetite, emaciation, paleness, languor, and weakness, and frequent attacks of diarrhœa, or a chronic form of that disorder; all of which symptoms are greatly influenced by the regimen of the child, and are most readily removed by attention to that point, and by the use of tonics and stimulants.

The other causes enumerated need but little comment. We will merely remark that we have several times observed a predisposition to weakness of the digestive organs, transmitted apparently from parent to child. As to the influence of the second dentition, we have no doubt that it is a frequent cause of the complaint, and we believe that it is too little attended to by practitioners.

Anatomical Appearances.—It has already been stated that we look upon this disorder as one of purely functional disturbance in many instances. We are led to take this view by the fact that it is so often unattended by any of the ordinary signs of inflammatory action, and because some very competent observers affirm that they have failed to find in a certain proportion of cases of fatal diarrhœa, any lesions appreciable to the senses. Thus, M. Billard says (*Mal. des Enfants*, p. 392): "Many children at the breast have diarrhœa without enteritis; they lose color, become etiolated, fall into a state of marasmus, and yet at the autopsy not a trace of inflammation of the intestines is found." M. Bertin (*Mal. des Enfants*, 2ème ed., p. 574) states that of 57 cases of gastro-intestinal disease observed by himself, there were 4 in which not a trace of inflammation, or any other appreciable lesion of the digestive tube, could be found. MM. Rilliet and Barthez, in their first edition (t. i, p. 491) assert that in about every twelve children affected with more or less abundant diarrhœa, and in whom we might expect to find colitis, there will be one in whom the gastro-intestinal tube will be found in a state of perfect integrity. They add that this conclusion is deduced from a comparison of nearly three hundred autopsies. We do not find this statement given in their second edition, but we do find there (t. i, p. 693) the following paragraph: "Quite frequently, especially in early infancy, in cases in which the symptoms have pointed to some disease of the gastro-intestinal tube, an autopsy reveals no lesion of the solids, or only changes of minimum importance. The secretions alone are vitiated." One must suppose, therefore, that the class of cases which we describe as simple diarrhœa, are sometimes quite independent of any anatomical changes in the tissues, recognizable by our ordinary methods of examination, or that those changes are so slight and so evanescent as to disappear after death; or that they are those only of the mildest forms of catarrhal inflammation. It is not unlikely, it seems to us, that further and more minute investigation, especially with the microscope, will reveal tissue-changes which are not discoverable by the unassisted senses.

When the anatomical changes, constituting the catarrhal state, are found in children who presented during life the symptoms of simple diarrhœa, they will be such as are described by Niemeyer in the following passage: "Catarrh rarely affects the entire intestinal canal. It is most frequent in the large intestine, less so in the ileum, and rarest in the jejunum and duodeum. The anatomical changes left in the cadaver by acute catarrh, are sometimes pale, at others dark redness, swelling, relaxation, and friability of the mucous membrane, which is sometimes diffuse, at others limited to the vicinity of the solitary glands, and of Peyer's patches, and a serous infiltration of the sub-mucous tissue. Occasionally, after death, the injection has entirely disappeared, and the mucous membrane appears pale and bloodless. Swelling of the solitary glands and glands of Peyer is an almost constant appearance; they distinctly project above the surface of the mucous membrane. The mesenteric glands also are usually found hyperæmic and somewhat enlarged. The contents of the intestines consist at first of plentiful serous fluid, mixed with detached epithelial and young cells, subsequently of a cloudy mucus, which is adherent to the wall of the intestine, and contains epithelial structures."

The best description that we are acquainted with of the anatomical appearances found in the intestines in fatal cases of diarrhœa, not in children, to be sure, but in adults, is that given by Dr. Woodward in his work on *Camp Diseases* (Philadelphia, 1863). In that work (page 216), under the head of simple diarrhœa, he says that this form of diarrhœa is to be regarded as usually the result of irritation of the intestinal mucous membrane, produced by the ingestion of improper food, or other causes mentioned, and expressing itself in increased secretion throughout the intestinal tract. The irritation, he goes on to say, may even amount to inflammation. Opportunities for post-mortem examination, occur but rarely. "They reveal little that bears on the nature of the disease, except congestion of the intestinal vessels of variable intensity." At page 246, will be found a description of the histology of the intestinal lesion in chronic diarrhœa, including the changes observed in specimens but moderately diseased, which latter would probably be the analogue of what we might expect to find in the simple diarrhœa of children we are now describing. We must refer the reader to the work itself, as the passage is too long to be quoted in full here; but we cannot help thinking that Dr. Woodward's descriptions would apply also to the changes induced in children by like causes, and leading to similar forms of disease.

SYMPTOMS.—We shall describe first the symptoms of simple diarrhœa in infants, and afterwards those which characterize the disorder in older children. In infants the appearance of the diarrhœa is usually preceded or accompanied by slight disturbance of the temper and comfort of the child. There is some degree of *restlessness, peevishness*, and disposition to cry; the child sleeps less than usual and often starts and moans during sleep; all of which symptoms are more marked, as is the case indeed in nearly all the ailments of children, during the night. Though the symptoms described are observed from time to time, and particularly during the night, they are not always present, as the infant will occasionally through the day seem perfectly well and comfortable, with the exception, perhaps, of slight paleness and languor, almost always perceptible upon its countenance. There is no *fever* in these cases, or at least nothing more than unusual warmth of the hands, feet, and abdomen at night. If a marked febrile reaction take place, there would be reason to suspect the existence of some degree of entero-colitis. The *mouth* often becomes, after a few days, a little warmer and less moist than usual; the *tongue* is generally moist and only slightly coated; and the *appetite* is commonly diminished, as shown by the child's nursing with less eagerness and at longer intervals than before. In very mild cases the *stools* are at first, and sometimes throughout the attack, feculent; the only differences from their ordinary characters are that they are more frequent, thinner, more copious than usual, and that the odor is changed so as to become acrid and offensive. In severe cases, they contain less feculent matter, become yet more fluid and sometimes watery, and exhibit small particles of a greenish color scattered through them; or the whole of the discharge is of a deep green color, and it is intermixed with portions of mucus. In many of the cases, whitish lumps, evidently consisting of undigested curd, are observed mixed with the other substances upon the napkin. The number of stools varies from two, three, or four, to six or eight in the twenty-four hours. The number last mentioned is seldom exceeded so long as the diarrhœa remains simple. The *abdomen* is seldom distended or painful to the touch. The *general appearance* of the child almost always shows the effects of the malady upon the constitution after a few days. The countenance becomes paler and thinner; the eyes look somewhat hollow; the edges of the orbits are more defined, and often present a pale bluish circle; slight emaciation takes place, and the flesh of the child becomes softer and more relaxed than before the attack. The *duration* of the disorder is generally short, as it seldom lasts more than three or four days or a week. It may terminate in complete restoration to health, without having exposed the life of the child to danger, or, if the causes which gave rise to it continue in action, if the child is of delicate constitution or the treatment not correct, and especially if this is of too perturbating a character, it is very apt to run into entero-colitis and expose the patient to all the dangers of that disease.

In older children (after the first dentition), the disease is much less frequent than in infants, and presents a different train of symptoms. Often it is nothing more than a slight disorder of the bowels, amounting to three, four, or five stools, thinner and more abundant than usual, accompanied by slight colicky pains, and unattended by fever or other signs of sickness, which, after continuing one, two, or three days, ceases, and the child regains its usual health. Some children are particularly liable to these attacks, and suffer from them every few weeks, or after any indiscretion in diet; whilst in others they are rare, let the diet be what it may.

There is another form of simple diarrhœa, however, of which we have seen nine cases, much more troublesome than the one just described. It occurs in children from two and a half to seven and eight years of age, lasts a considerably longer time, and is much less under the control of remedial measures. This form of the disease has never, in the cases that we have seen, been accompanied by fever, or by any constitutional symptoms rendering it necessary to confine the child either to the bed or house. The only symptoms besides the diarrhœa which we have observed, have been some degree of paleness and moderate emaciation; slight weakness, shown by an indisposition on the part of the child to play with its usual spirit, by an inclination to lie about from time to time through the day on the sofa or floor, and by complaints of "being tired;" irritability of temper and peevishness; irregular appetite; picking of the nose; and restless, disturbed sleep at night, attended with moaning, crying, starting, and grinding of the teeth; all of which symptoms generally convince the mother that the child is suffering from worms. The abdomen is sometimes slightly tumid, but remains natural as to tension, and is not painful on pressure. There is no pain except slight colic in some cases. The stools have generally numbered from three to five, and in a few cases as many as six or eight a day. They are semifluid in consistence, often of a very offensive odor, and consist usually of feculent matter, which is sometimes clay-colored, more frequently dark brown, and, in other instances, deep yellow or orange in color. They are often also of a frothy character. In two of the nine cases that we have seen, there was lientery whenever the aliment was otherwise than of the lightest and most digestible kind. In all, the diarrhœa was evidently greatly influenced by the diet, showing, it appeared to us, a manifest dependence of the malady upon the condition of the stomach, which seemed to have lost to a great degree its digestive power.

The *course* of the disease in this form was variable. In some it would last a few weeks, and then, under the influence of diet and remedies, cease, to recur and run the same course after a short period. In others it has lasted a much longer time in spite of all treatment that we attempted. In three of the cases it continued between three and four months, with occasional slight remissions, brought about apparently by remedies which a day or two after would lose their effect. In two others it lasted about two months; in another six weeks, in another a month; in the remaining two cases the exact duration is not recollected.

Diagnosis.—The diagnosis of simple diarrhœa will rarely present any difficulties, since there is nothing with which it could be confounded, except the diarrhœa from tubercular ulceration of the bowels, or entero-colitis. From the former it is to be distinguished by the history of the case, and by the signs of tuberculosis in other parts of the economy; from the latter, by the absence of signs of inflammatory action.

Prognosis.—The prognosis is favorable so long as the disease remains simple. The physician should never forget, however, the disposition which is inherent in it to pass into entero-colitis, nor fail to make the possible occurrence of this transition one element in his prognosis. During infancy it is always more serious than after that period, from the feebler power of resistance on the part of the constitution at that age to disease, which undoubtedly allows this simple affection to prove fatal in some instances, probably from the shock to the nervous system. After infancy it is rarely a dangerous disorder, both because of the greater stamina

## SECTION II.

### DISEASES OF THE STOMACH AND INTESTINES, ATTENDED WITH APPRECIA ANATOMICAL LESIONS.

## ARTICLE I.

### GASTRITIS.

GASTRITIS, in the sense in which the term was used some ten or twe years since, viz., to express an individual and special inflammatory d ease of the stomach, of common occurrence and of supposed great sever and importance in childhood, is now well known to be a rare affecti It is doubtful, indeed, whether it ever forms a special visceral inflam tion, except in consequence of the direct application to the organ of so irritant substance, such as the mineral acids or arsenic, or, as Rilliet a Barthez found, in a few instances, certain remedial agents, as tar emetic, kermes mineral, and croton oil. In the form of catarrh, acute chronic, of the mucous membrane, on the other hand, it is doubtless o of the most common affections of childhood, constituting an importa element in a great many diseases, and especially in the severe forms indigestion, in simple and inflammatory diarrhœa, in cholera infantu and in many of the wasting diseases of childhood, which result from t use of improper artificial diet in infants, and of crude and indigestib articles of food in older children.

We had almost abandoned the plan followed in our last edition, devoting a special chapter to this subject, but, on further considerati think it will be best to treat of it separately, since, as stated above, cas do occur in practice in which the stomach is the chief, if not the onl seat of disease, and which can be properly designated and described o under the title of gastritis.

CAUSES.—It has already been stated that the most violent and ty cal cases of gastritis, as a distinct disease, are the result of the applic tion to the organ of some special irritant, as the mineral acids, arsenic boiling water, or of certain remedial agents, and particularly of tart emetic, kermes mineral, or croton oil. These latter agents, the drug just mentioned, cannot produce this effect unless used in large doses, when continued for too long a time. The quantities of the antimoni preparations formerly administered, were always thought by us to b dangerously large, and we were not at all surprised to find that MM. Ri liet and Barthez, from their experience in former years in the Children' Hospital in Paris, cited them as one of the causes of acute gastritis. In the *Journal für Kinderkrankheiten*, for the years 1859, 1860, and 18 in the third, fourth, and fifth annual reports of the Public Institute fo Children's Diseases, of Vienna, by the Director, Dr. Luzsinsky, may be found in the third report three cases, in the fourth three cases, and i the fifth two cases of gastritis caused by the accidental drinking of concentrated lye.

The milder forms of gastritis are vastly more common than the ones above referred to. They are generally associated with disturbances of the intestinal tube also, and constitute by far the majority of the cases which come under the observation of the physician. They are caused very generally by improper alimentation; by the same causes, indeed, as those which determine indigestion. In infants, an unhealthy state of the mother's or wet-nurse's milk, the use of too rich a preparation of cow's milk, milk obtained from an unhealthy cow, or a food composed of too large a proportion of farinaceous material, are the most common causes. In older children, an unwholesome meal, as a surfeit of cakes and candies, tough meats, unripe, or an excess of ripe fruits, the swallowing of a quantity of skins of grapes, of orange peel, of the seeds of oranges, or such like imprudences or accidents, of all which we have seen examples, will sometimes occasion symptoms which we can refer only to acute catarrh of the stomach. In such cases the child may escape any serious consequences if it rejects, by vomiting, the improper food, soon after it has been taken. Or it may have an attack of cholera infantum or cholera morbus, and either recover its usual health in a short time, or pass through a longer or shorter illness, as the result of these disorders; or, lastly, the unhealthy food may be retained for a longer time than usual in the stomach, and acting as a local irritant on the gastric mucous membrane, may set up a true and more or less severe form of the disease we are considering.

Anatomical Appearances.—Death is so rare a consequence of gastritis alone, except in the form produced by the direct application of irritants to the organ (and even in such, recovery appears to be the rule, since all the eight cases referred to as reported by Dr. Luzsinsky recovered), that it is difficult to present a description of the lesions characteristic of this variety of the disease. M. Billard, however (*Mal. des Enfants*, p. 353), gives a case from M. Denis, and one observed by himself. M. Denis found the mucous membrane of a deep brown color, of a fetid odor, reduced here and there to a state of putrilage, and everywhere easily removed in softened strips. A fluid of the color of lees of wine, was found macerating the changed mucous membrane, and this he could ascribe only to gangrene from excessive inflammatory action. The case observed by Billard occurred in a girl three days old, who was brought to the infirmary with a quantity of blackish blood passed into the napkins, and also vomited. The child died on the following day. The mouth and œsophagus were healthy, but the mucous membrane of the stomach was completely destroyed, not far from the cardiac orifice, over a space as large as a thirty sous piece. The centre of this space was stained with blackish blood, and its edges, irregularly fringed, were blackened and looked as though they had been burned. Outside of this dark circle, the mucous membrane was thickened, of a violet-red color, and easily reduced to a pulp. The whole surface of the organ was lined with semi-fluid matters, of a bistre color, mixed with sanguinolent striæ, and the mucous membrane, beneath these matters, was very thin and discolo especially near the pylorus. The small intestine was stained yellow bile, and contained fragments of coagulated blood. The large intest was healthy. The liver was bloodless and pale; the spleen small and slightly injected. No clue is given as to the cause of this grave lesio

The gastric lesions belonging to catarrh of that organ are very o met with, as we have already stated, but are almost always associ with changes in the intestinal mucous membrane. They are observe severe indigestion, in simple and inflammatory diarrhœa, and in cho infantum. For a full account of the histology of this lesion, we m refer the reader to the essay on Gastritis and Acute Gastric Cata by Dr. Wilson Fox, in the *System of Medicine*, edited by Dr. J. Rus Reynolds. We shall, however, quote the shorter description given Dr. Niemeyer (*op. cit.*, vol. i, p. 476), of acute gastric catarrh. He sa "We seldom have the opportunity of seeing the remains of acute gas catarrh in post-mortem examinations; when we do, the gastric muc membrane is found reddened in spots by a fine injection; its tissue is laxed, and its surface covered with a layer of tough mucus. But m frequently, especially among children who die with the symptoms cholera infantum, the autopsy gives negative results, except as to appe ances which will be described hereafter. This does not appear stra when we remember that the capillary hyperæmias of other mucous me branes, which we have been able to observe directly during life, leave trace after death, and that a relaxation and partial loss of epitheliu which we have regarded as the most probable cause of the extensi transudation in cholera infantum, may be very readily overlooked in dead body, and can very rarely be observed with certainty."

The description of the anatomical appearances in gastritis will not complete without some reference to a lesion which, some ten or twen years since, was thought to be one of great importance in children. Th lesion, known by the names of softening or gastro-malacia, was suppos by some to constitute a distinct pathological entity, and to be the resu in most cases of inflammatory tissue-changes determined by many diffe ent causes. Even then, however, not a few observers believed that th lesion was a post-mortem change, and not the consequence of chang caused by disease during life. This latter opinion has continually gaine ground, until now it is generally believed that, when present in a marke degree, it is in fact a cadaveric change. Niemeyer (*op. cit.*, vol. i, p. 47 says that the gastro-malacia or softening of the walls of the stomach, foun on autopsy in children, is always a post-mortem appearance, and that a child dies who has had vomiting and purging from abnormal fermenta tion in the stomach, and if there are still fermenting substances left ther the fermentation will not be arrested by the gradual cooling of the body When the circulation ceases, the stomach can no longer resist the decom position, which then extends to it also, just as the stomach that has bee cut out of an animal and filled with milk, softens if left only for a shor time in a warm place. Hence physicians who consider softening of th stomach as a post-mortem appearance, may also predict it with certaint when a child that has died of cholera infantum had eaten milk, or any other easily decomposed substance, shortly before death."

That a certain degree and kind of softening does, however, attend upon catarrhal inflammation of the gastric mucous membrane, as a result of faulty nutrition of the tissues during life, is probably quite as true as that the extensive white softening of one or more of the coats of the organ, not unfrequently met with, is the consequence of a post-mortem change. Thus Dr. Wilson Fox (*loc. cit.*, p. 858) asserts, that the softening of the mucous membrane which accompanies acute catarrh is totally distinct from the post-mortem softenings, which are distinguished by the transparency of the tissues. "It rarely exists," he says, "to any marked degree, except in extreme cases, but there is always a certain diminution of resistance to the finger-nail or to the scalpel, which materially assists, when conjoined with opacity and thickening, in distinguishing this condition. Louis's test of the extent to which it can be torn from the submucous tissue is a less available one, and applies rather to the states of post-mortem solution than to this condition."

SYMPTOMS.—It is very difficult to give an accurate account of the symptoms of inflammation of the stomach, for the following reasons: they have not as yet been studied with a sufficient degree of care; gastritis is, as was stated in the early portion of this article, rarely idiopathic, but almost always a secondary affection in the course of other maladies; the symptoms which betray it resemble so closely those of intestinal diseases, as to make it very difficult, if not impossible, to draw a distinction between the two; and lastly, in the great majority of cases, gastric complaints coexist with intestinal.

The most important symptoms are vomiting, diarrhœa, loss of appetite, thirst, epigastric tenderness, sometimes tension of the abdomen, and slight febrile reaction.

*Vomiting* is the most important of the different symptoms of gastritis. It is not, however, acccording to MM. Rilliet and Barthez, invariably present. It was observed by them particularly in cases following the administration of active remedies, while in those which occurred spontaneously, it was much less common. It shows itself especially after the taking of food or drink. Sometimes when the stomach is empty, there is simply nausea and retching. In severe cases the vomiting is frequent, and accompanied by violent straining and pain. *Diarrhœa* exists in most cases, whether the attack be one of simple gastritis, or accompanied with enteritis. The *appetite* is generally lost or greatly diminished. *Thirst* is commonly acute, and often intense. The *tongue* is described by some writers as being generally red, and sometimes smooth and glazed. The authors above quoted, state, on the contrary, that it presents nothing peculiar in most cases. It was generally moist, only slightly colored, covered with a white or yellow coat of variable thickness, and in some rare instances, red on the edges and tip, or gluey, or even dry and harsh. As a general rule, the *abdomen* is normal, according to the same authors, though in some cases there is more or less swelling and tension. According to most writers there is generally tenderness on pressure in the epigastrium. Infants and young children are commonly restless and un as though in more or less pain, while those who are older complai burning in the region of the stomach. It is well to remark that Rilliet and Barthez state that tenderness on pressure often exists, n the epigastrium, but in one of the iliac fossæ, or at the umbilicus, when the stomach alone is inflamed. The condition of the circulat and indeed all the symptoms, depend so much upon the nature of concomitant malady, that it is difficult to ascertain what are their characters in simple gastritis. Most writers agree that *fever* usually companies the disease, and that it is commonly of the remittent type. is certain, however, from other observations, that it is not always pres

In very violent cases there are added to the symptoms just descri those indicative of an adynamic state of the nervous system: prostrat cool or cold skin, with perspiration; weak, rapid pulse; singultus; s times convulsions, and death. The symptoms which have just been tailed as indicating the presence of gastritis, do not generally exist al They are much more frequently than not associated with other sympto which show the presence of intestinal disease in the form either of sim or inflammatory diarrhœa. That they do sometimes, however, exist al and that, too, independently of the action of irritating drugs, or of rosive poisons, we cannot ourselves doubt, since we have several ti seen them follow attacks of simple indigestion. In such cases, we h met with all the symptoms usually supposed to indicate an inflamed st of the gastric mucous membrane,—repeated and obstinate vomiting, gastric tenderness, entire loss of appetite, and more or less acute fe We have, to be sure, never seen a post-mortem examination of suc case, for we have never yet known one to prove fatal. Whether we such an attack gastritis, acute catarrh of the stomach, or *embarras g trique*, matters not much. It is the condition which has long been look upon as indicating an inflammatory state of the gastric mucous membra and until we have more positive evidence than has yet been adduc that inflammation has nothing to do with it, we shall deem it best to tain the old title.

DIAGNOSIS AND PROGNOSIS.—The *diagnosis* must rest chiefly on t existence and frequency of vomiting, on the presence of epigastric p or tenderness, of swelling and tension of the abdomen and excessi thirst, and on the absence of other disease which might account for t illness of the child.

The *prognosis* will depend on the severity of the gastric and consti tional symptoms, and on that of the concomitant disease, when the tack is secondary. When there is incessant and obstinate vomiting, that not even water in small quantities can be retained after several hou of sickness, when the tongue is red and glazed, or dry and brown, an when adynamic symptoms make their appearance, and emaciation mak rapid progress, it is much to be feared that extensive organic change ha taken place, and that the case will prove fatal.

TREATMENT.—The two most important points in the treatment are the withdrawal of the causes that may have produced, or may tend *to kee* up the disease, if these can be detected, and strict attention to diet. Whenever, therefore, the symptoms have made their appearance after the exhibition of powerful drugs, as tartar emetic, kermes mineral, or cathartics, their use ought to be instantly suspended. The child should be put on the strictest diet. If at the breast, it must be allowed to nurse only at rare intervals, and to take but little at a time. If fed on artificial diet, it should be restricted to barley or arrowroot water, to very weak milk and water, or to small quantities of milk diluted with lime-water, in the proportion of a third or a half of the latter. This is one of Dr. Chambers's favorite prescriptions, and is an admirable one. Nothing solid and no rich liquid nourishment ought to be allowed, unless the child is in a state of weakness and debility from previous or concomitant disease, such as to make it absolutely necessary to endeavor to maintain its strength. Billard even recommends that the child be sustained by means of nutritive enemata, consisting of farinaceous substances, while the digestive function is allowed a total rest.

*Antiphlogistics* are useful and proper when the disease occurs in a strong and healthy child, when it is associated with fever, and when there is nothing in the nature of the accompanying disease, if it be a secondary case, to prevent their employment. The most suitable mode of depletion is by leeches, which should be applied to the epigastrium. It is best to take but a very moderate quantity of blood, for fear of exhausting the patient. After the use of the antiphlogistic remedy, a warm bath will be found of great service in moderating the heat of the skin and rendering the child more comfortable. Small pieces of ice ought to be put into the mouth occasionally as a refrigerant, or small quantities of iced drinks may be allowed from time to time. As soon as the bleeding from the leech-bites, if leeches have been employed, has ceased, a warm light mush poultice to the epigastrium is a valuable and useful remedy. Some writers recommend the use of blisters to the epigastrium. We should much prefer a warm poultice or the occasional application of a mustard poultice. *Opiates* are useful in allaying nausea and vomiting, and appear to exert a favorable influence on the progress of the disease.

When vomiting is frequent and troublesome, it may generally be allayed by the administration of lime-water and milk, given in teaspoonful quantities every fifteen minutes or half hour; by observing the precaution of allowing the food and drink to be given only in the smallest quantities (from a teaspoonful to a tablespoonful) and at considerable intervals; by the application of warm cataplasms over the abdomen, or a spice-plaster to the epigastrium; or, lastly, by the exhibition of a few drops of laudanum or paregoric, to be repeated if necessary. If the child becomes weak and exhausted, with coolness and abundant moisture upon the limbs, we must resort to the administration of some kind of stimulant. The best is weak brandy and water, given in very small quantities; or we may employ wine-whey, or milk punch, or the aromatic spirit of hartshorn.

and in the mucous, muco-purulent, or muco-sanguineous stools, the of inflammatory changes in the intestinal mucous membrane; and exhibits, after death, the tissue-changes in the small and large intest which are regarded as the products of inflammation of those organs.

The disease is one of the most common and one of the most fata childhood. Few young children die in the foundling hospitals ab or in the hospitals and almshouses of this country, from insufficie improper food, but die of this affection. Many, a large majority, think, of the deaths accredited to cholera infantum belong to this order. The true choleraic disease is constantly passed through safety, but is followed by a long, obstinate, exhausting diarrhœa. is in truth an inflammatory diarrhœa occurring as a sequel to cholera.

A large proportion of the cases of summer diarrhœa are, from the ginning, cases of this kind; or they commence as merely functional turbances of the intestine, and run, sooner or later, into the disorder are now considering. It is one of the most important diseases of you children, especially in this country, where our long summer heats, the filthy condition of many parts of some of our most famous give it a degree of prevalence and fatality which raise it to the almost of a pestilence.

We believe that most of the cases of diarrhœa in children, no ma what may have been the exciting cause at the start; whether a consta improper diet, as in hand-fed children; whether ill-judged experim in new foods by the mother or nurse; whether the accidental use of wholesome food; whether summer heats, exposure to unhealthy and exhalations, crowding, malarial or epidemic causes, dentition, reside in cities, or what not, are prone to end, are nearly certain to end, if th become chronic, in this disease. This opinion is the result of the ex rience of one of us in private practice, in this city, during twenty- years. It is curious, too, and it is confirmatory of the it is impossible to determine accurately the mortality it occasions in this city, from the returns as at present made by our physicians.

Thus during the past seven years (1862–1868 inclusive) there were 7273 deaths under five years of age in this city, from the three diseases, cholera infantum, diarrhœa, and dysentery (not to include a comparatively small number returned as due to colic, marasmus, inflammation of the stomach and bowels, aphthæ, &c.). Of these, as will be seen by inspection of the accompanying table[1] (see p. 344), by far the greater proportion, namely 5963, are recorded as due to cholera infantum. Our extended opportunities of observing the diseases of children in this city have, however, led us to the conviction already expressed in the remarks which preface this article, that the great majority of these cases should in reality be entitled entero-colitis, while the true choleraic disease, to which alone the term cholera infantum should be restricted, is a comparatively infrequent affection.

We may appreciate yet more accurately the importance and frequency of the disease, by reference to the statements of MM. Rilliet and Barthez, who say (1ère édit., t. i, p. 483), that, taking into consideration all the cases they observed, including tubercular cases, they find that of every two children that die, one presents a more or less serious lesion of the large intestine. They add: "If it be recollected that this holds true particularly in regard to younger children, it will be seen that it is rare for a child to die between two and five years of age, without having either colitis or softening of the large intestine." Bouchut states that entero-colitis is one of the most dangerous affections of children at the breast: "It is the most common of all those incident to that age" (p. 210).

We shall describe two forms of the disease, the *acute* and *chronic*. The acute form is accompanied by active and inflammatory symptoms from the first, and runs its course in a few days or weeks; the chronic form is unaccompanied by acute symptoms, and lasts several weeks or months.

CAUSES.—The two most important causes of this disease amongst us, are improper alimentation and the heats of summer. The improper alimentation consists in an unhealthy state of the nurse's milk, or, what is much more common, of some improper kind of artificial nutriment; of the latter, the kind of food most apt to produce the effect, is one composed exclusively or in considerable proportion of some of the feculent substances, which constitute so large a portion of the diet of children throughout the civilized world. To prove the truth of this assertion it is only necessary to quote the opinions of those who have most carefully studied the subject. M. Valleix (*Guide du Méd. Prat.*, t. iv, p. 60, 61, and *Bulletin Gén. de Therap.*, article Acute Enteritis of Adults and New-born Children, March, 1845), clearly asserts that the most frequent cause of muguet, which he believes to be essentially connected with enteritis, is a too exclusively

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[1] We are indebted to the courtesy of Mr. Chambers, the clerk of the Board of Health in this city, for the opportunity of collating portions of this table from the monthly returns of mortality calculated by him.

TABLE, SHOWING THE MONTHLY MORTALITY FOR THE LAST SEVEN YEARS
YEARS OF LIFE; COMPARED WITH THE TOTAL MONTHLY MORT

| MONTH. | 1862. | | | 1863. | | | 1864. | | | 186 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MORTALITY. | | | MORTALITY. | | | MORTALITY. | | | MORTALITY. | |
| | Cholera Infant. Dysent. Diarrh. | Total. | Mean Temperature. | Cholera Infant. Dysent. Diarrh. | Total. | Mean Temperature. | Cholera Infant. Dysent. Diarrh. | Total. | Mean Temperature. | Cholera Infant. Dysent. Diarrh. | Total. |
| Jan., | 1<br>2<br>4 | 1314 | 32.46° | 0<br>3<br>3 | 1061 | 38.25° | 1<br>0<br>5 | 1302 | 33 28° | 1<br>6<br>3 | 1373 |
| Feb., | 1<br>3<br>1 | 1080 | 32.70° | 5<br>3<br>2 | 1122 | 35° | 0<br>3<br>0 | 1434 | 35.97° | 2<br>2<br>1 | 1350 |
| March, | 2<br>2<br>3 | 1204 | 40 25° | 0<br>2<br>7 | 1172 | 37.26° | 4<br>1<br>5 | 1894 | 40.5° | 3<br>1<br>2 | 1868 |
| April, | 3<br>1<br>4 | 1213 | 50 61° | 2<br>5<br>6 | 1488 | 49.80° | 2<br>2<br>6 | 1377 | 50.58° | 5<br>3<br>4 | 1411 |
| May, | 9<br>4<br>5 | 1343 | 63.70° | 5<br>1<br>6 | 1060 | 64.63° | 10<br>5<br>8 | 1529 | 67.20° | 10<br>6<br>7 | 1227 |
| June, | 20<br>3<br>8 | 1002 | 69.14° | 14<br>2<br>5 | 961 | 68.67° | 74<br>11<br>14 | 1245 | 72° | 184<br>10<br>20 | 1690 |
| July, | 300<br>21<br>31 | 1767 | 75.23° | 313<br>17<br>38 | 1859 | 77.07° | 259<br>24<br>32 | 1643 | 76.08° | 364<br>52<br>41 | 1898 |
| Aug., | 217<br>19<br>22 | 1755 | 76.70° | 464<br>25<br>28 | 2044 | 79.46° | 250<br>27<br>31 | 1956 | 79.40° | 245<br>42<br>23 | 1709 |
| Sept., | 60<br>4<br>9 | 1037 | 69.36° | 105<br>15<br>9 | 1453 | 64.73° | 28<br>16<br>10 | 1251 | 65° | 44<br>14<br>7 | 1040 |
| Oct., | 15<br>5<br>4 | 1235 | 58.32° | 14<br>4<br>5 | 1104 | 56.08° | 9<br>8<br>4 | 1144 | 54.75° | 15<br>12<br>5 | 1084 |
| Nov., | 0<br>2<br>5 | 1021 | 45.20° | 5<br>0<br>1 | 1061 | 47.72° | 2<br>2<br>1 | 1212 | 45.80° | 9<br>8<br>3 | 1286 |
| Dec., | 0<br>1<br>2 | 1124 | 36.06° | 3<br>2<br>1 | 1404 | 35.41° | 2<br>2<br>4 | 1595 | 36.77° | 0<br>2<br>3 | 1044 |
| Total, | 803 | | | 1120 | | | 862 | | | 1139 | |

A INFANTUM, DYSENTERY, AND DIARRHŒA, DURING THE FIRST FIVE
LL CAUSES, AND THE MEAN MONTHLY TEMPERATURE.

| 1866. | | 1867. | | | 1868. | | | Mean Mortality for Seven Years from Cholera Infantum, Dysentery, and Diarrhœa. | Mean Total Mortality for Seven Years. | Mean Temperature for Seven Years. |
|---|---|---|---|---|---|---|---|---|---|---|
| ITY. | | MORTALITY. | | | MORTALITY. | | | | | |
| Total. | Mean Temperature. | Cholera Infant.<br>Dysent.<br>Diarrh. | Total. | Mean Temperature. | Cholera Infant.<br>Dysent.<br>Diarrh. | Total. | Mean Temperature. | | | |
| 1402 | 29.31° | 3<br>0<br>4 | 1376 | 25.89° | 2<br>2<br>1 | 1249 | 30.12° | $7\frac{1}{7}$<br>2<br>$3\frac{3}{7}$ | $1296\frac{5}{7}$ | 30.87° |
| 1156 | 34.14° | 3<br>2<br>3 | 1042 | 40.21° | 0<br>0<br>0 | 1063 | 26.65° | $1\frac{5}{7}$<br>$2\frac{1}{7}$<br>1 | $1206\frac{5}{7}$ | 33.89° |
| 1082 | 40.85° | 3<br>1<br>2 | 1094 | 38° | 1<br>1<br>1 | 1096 | 41.12° | $2\frac{2}{7}$<br>$1\frac{1}{7}$<br>$3\frac{3}{7}$ | $1344\frac{2}{7}$ | 40.85° |
| 1034 | 56.06° | 1<br>2<br>0 | 1088 | 54.13° | 9<br>5<br>2 | 1357 | 48.24° | 4<br>3<br>$3\frac{5}{7}$ | $1281\frac{1}{7}$ | 52.27° |
| 1304 | 61.37° | 7<br>2<br>3 | 1260 | 59.44° | 4<br>1<br>6 | 917 | 59.66° | $7\frac{4}{7}$<br>$2\frac{6}{7}$<br>$4\frac{6}{7}$ | $1234\frac{3}{7}$ | 62.77° |
| 1168 | 73.04° | 38<br>6<br>5 | 980 | 72.19° | 71<br>8<br>7 | 1201 | 71.99° | 67<br>6<br>$9\frac{5}{7}$ | $1178\frac{1}{7}$ | 71.97° |
| 2047 | 80.37° | 423<br>23<br>31 | 1795 | 76.48° | 423<br>14<br>32 | 1900 | 80.94° | $358\frac{3}{7}$<br>$24\frac{4}{7}$<br>$34\frac{1}{7}$ | 1837 | 77.71° |
| 2401 | 72.5° | 265<br>26<br>25 | 1294 | 75.10° | 327<br>19<br>34 | 1570 | 78.42° | $304\frac{6}{7}$<br>$27\frac{5}{7}$<br>$29\frac{1}{7}$ | $1825\frac{3}{7}$ | 76.62° |
| 1362 | 69.42° | 88<br>13<br>9 | 1012 | 68.21° | 128<br>14<br>24 | 1353 | 68.80° | $77\frac{3}{7}$<br>13<br>$11\frac{4}{7}$ | $1215\frac{3}{7}$ | 68.31° |
| 1828 | 58.35° | 24<br>0<br>10 | 1177 | 57.65° | 20<br>2<br>3 | 955 | 54.08° | 152<br>$4\frac{6}{7}$<br>$6\frac{4}{7}$ | $1218\frac{1}{7}$ | 56.3° |
| 1037 | 48° | 6<br>2<br>5 | 871 | 47.79° | 3<br>2<br>0 | 878 | 46.91° | 31<br>$2\frac{2}{7}$<br>$2\frac{5}{7}$ | $1052\frac{1}{7}$ | 46.68° |
| 982 | 33.63° | 1<br>2<br>2 | 974 | 31.78° | 1<br>0<br>3 | 1154 | 32.16° | 9<br>$1\frac{4}{7}$<br>$2\frac{1}{7}$ | 1191 | 34.7° |
| | | 1040 | | | 1057 | | | | | |

system of diet disproportioned to the digestive powers, recommends that children be confined almost exclusively to the breast until after the first dentition is completed. Barrier, speaking of the follicular diacrisis (loc. *cit.*, t. ii, p. 40), states that the artificial food given to children at the period of weaning is a frequent cause of the affection, and that of all the different kinds of food habitually employed at that period, feculent substances are the most injurious. We have frequently known entero-colitis to follow the employment of artificial diet, either alone, at the period of weaning, or in children who were partly nursed. Children fed wholly on artificial diet from birth, rarely escape, according to our experience, attacks of the disease, which in many prove fatal. We have, on several occasions, seen children recover rapidly from such attacks, after suffering more or less for weeks, by the suspension of a diet consisting wholly or in too large proportion of farinaceous materials, and the substitution of one composed of milk and cream, prepared with gelatine, and containing a very small quantity of arrowroot, rice, or wheat flour (see article on thrush, page 304). It is not merely the quality, but the quantity also of artificial food that proves injurious to infants. Over-feeding has always been recognized as a fruitful source of bowel complaints in early life. Another cause is the preparation of the food in too thick and rich a manner, thereby overtasking the stomach, intended during the early months to receive only the thin milk supplied by nature. The custom, therefore, of feeding infants on thick oatmeal gruel, with but little or no milk, on what is called cracker victuals (pounded crackers with water and sugar or milk), on thick bread and milk, on preparations of rice of too solid nature, or indeed, on any kind of diet not consisting chiefly of milk, and in which feculent substances enter merely as secondary constituents, may safely be asserted to be the most frequent cause of the disease under consideration.

apt to suffer either from the disease under consideration, or from simple diarrhœa.

That the heats of summer are a most fruitful cause of this disease, no one can doubt who will glance at the table given at pages 344 and 345, where the mortality from cholera infantum, dysentery, and diarrhœa, under five years of age, in this city, during the seven years from 1862 to 1868 inclusive, is given.

The table shows, at a glance, the number of deaths from these diseases enumerated, during the period of life specified, in each month of every year, with the mean temperature of each month, and also the total mortality at all ages and from all causes in each year. The reader must not forget what we have already stated, that there is every reason to suppose that a large majority of the cases reported under the head of cholera infantum are, in fact, cases of entero-colitis,—at least what we have proposed to call entero-colitis, as opposed to the less frequent choleraic disease to which we restrict the term cholera infantum. It will be seen, in this table, that the two months of July and August furnish by far the largest proportion of deaths. In these two months, when the mean temperature is noted between 70° and 80° Fahr., the deaths from this disease run up to three and four hundred and upwards; whilst in June and September, when the temperature ranges between 60° and 70°, the deaths average between 60 and 80, and rarely rise over 100; and in January and December, with a temperature of from 30° to 40°, they number from between three and five to ten and fifteen. The effect of season is here so striking that it must interest all, and can leave no doubt, we think, in the mind of the reader, but that the elevated temperature of summer is the main cause, in this city, of the fatal intestinal disease we are considering. Whether heat alone may act upon the system of the child to produce this result, or whether it acts always by determining noxious gaseous products from the decomposition of animal and vegetable substances thrown into our streets, has not yet been demonstrated. From the well-known fact, however, that those children suffer most who reside in the more filthy and crowded part of the city, whilst the disease is very much less common in the open country, and in the cleaner and better ventilated parts of the city, we may safely conclude that it is not heat alone that usually causes the disease, but that the emanations arising from garbage of various kinds, and the imperfect ventilation of houses built in narrow and crowded streets, have much to do in its causation.

We referred, in the general remarks at the beginning of this chapter, to the resemblance of the chronic diarrhœa of our armies during the late great war, in its mode of causation, symptoms, anatomical lesions, and the effects of treatment, to the chronic form of entero-colitis in childhood.

Any one who will refer to the work of Dr. Woodward, already quoted; or to the essay on *Camp Diarrhœa and Dysentery*, by Dr. S. B. Hunt, in the *United States Sanitary Commission Contributions relating to the Causation and Prevention of Disease, and to Camp Diseases, &c.* (New York, 1867); or to the *Investigations upon the Diseases of the Federal* the account given above of the pathological anatomy of the disease, there can be little doubt that this affection is to be regarded as consisting essentially of a chronic inflammatory process, involving primarily the mucous membrane of the ileum and colon. It may, in fact, be described simply as a chronic ileo-colitis, with a tendency to ulceration." Dr. Hunt (loc. *cit.*, p. 294) says: "The essential fact in the pathology of all these various forms of flux is the same, and autopsies reveal no distinction between cases of diarrhœa and dysentery. They are alike an inflammation of the colon or of the small intestine, or of both, attended by ulceration of the mucous membrane. The solitary follicles of the colon are seen to be enlarged simply, or ruptured, with punched-out ulcerations following. The intestinal wall is thickened and changed in color to a red, brown, black, or greenish hue."

It may seem, at first view, visionary and wild to compare the chronic entero-colitis or inflammatory diarrhœa of childhood to the same disease in armies and camps; and yet we think there is a most striking analogy between the two as to causation, symptoms, anatomical lesions, pathology, and the results of treatment. The main causes are the same: improper diet; elevated temperatures, the high temperature of the summer season in children, and of the Southern States in the armies; overcrowding, and foul air in camps and cities: the symptoms are very much alike, a [illegible] obstinate diarrhœa, with great constitutional suffering and emaciation; the same lesions are present, only less advanced and extensive in the cases of children; and very much the same results follow treatment, as in both diet is found to be more important than drugs, and removal North in the armies, and in children removal from crowded cities or the hot regions of the country to more elevated and cooler tracts are found necessary. In children, as in armies, if, at the beginning of the attack the patient is removed from the causes which have produced a simple diarrhœa or a cholera infantum, the case is likely to go no further; but a physiological process, is a powerful predisposing cause of diarrhœa and enteritis, cannot be doubted at the present time. It is one recognized by many of the most able writers and observers of the day, and by most practitioners. MM. Rilliet and Barthez agree with Trousseau in the opinion that the simple diarrhœa so apt to occur in children at the epoch of the first dentition, is often the origin of chronic intestinal lesions which finally reduce them to extreme debility and emaciation. They say that careful investigation will generally show that nearly all the cases of inflammation and softening date either from the epoch of dentition, from the period of weaning, or from the time at which some considerable change in the character of the regimen was made. M. Bouchut states that of 110 children in whom the first dentition was going on, 26 escaped any indisposition, 38 suffered from restlessness, colics, and occasional diarrhœa, so mild as to excite no alarm in the parents, whilst 46 had abundant diarrhœa. In 19 of the last series it appeared coincidently with the fluxion of the gums, occurring at the time of emergence of each tooth, and disappearing entirely in the intervals; in the remaining 27, in all of which the process of dentition was difficult, the diarrhœa persisted and gradually assumed the characters of entero-colitis. M. Legendre and M. Barrier (*loc. cit.*) both agree in ascribing very great effect to the influence of dentition in the production of diarrhœa and entero-colitis. The former asserts the diseases referred to to be much the most frequent between the ages of six or seven months, and two or two and a half years, which includes exactly the period occupied in the first dentition, while they are only met with exceptionally after three years of age.

The act of *weaning* is very apt to result in the production either of simple diarrhœa or entero-colitis, in consequence, no doubt, of the irritation set up in the gastro-intestinal surface, by the change of food made at the time. The diarrhœa which occurs at this period was formerly, and is still, not unfrequently, called *weaning-brash*. Dr. Stokes (*Cyclop. of Med.*, Art. Enteritis) says of this disease that it "is manifestly an acute enteritis, produced by the change of food, and in which nature seeks to relieve the inflammation by a supersecretion."

Entero-colitis is prone to occur as a secondary affection in many of the acute diseases of children. It is by far the most common in the course of the eruptive fevers, particularly measles, and in that of typhoid fever. It is also a frequent complication of the latter stages of pneumonia.

That children of feeble constitution and lymphatic temperament are more disposed to the disease than others, is sufficiently proved by the evidence of various observers. Lastly, that the incautious and excessive use of perturbing systems of medication, addressed to the digestive tube, often occasions diarrhœa and entero-colitis, is fully proved by the researches of MM. Rilliet and Barthez, and by our own experience.

MORBID ANATOMY.—SEAT OF DISEASE.—It has been already stated, that the alterations of the large intestine are, as a rule, much more frequent and serious than those of the small intestine. It appears from the researches of MM. Rilliet and Barthez, and Legendre, that enteritis rarely exists alone; whilst colitis by itself, or combined with enteritis, is quite [illegible] (op. cit., p. [illegible]) [illegible] analysis of the post-mortem appearances in 82 cases of intestinal inflammation in children. The upper part of the small intestine, embracing the duodenum and jejunum, was found inflamed in 12 cases, while in [illegible] cases it was free from inflammation and of a pale color. The ileum was inflamed in 49 cases, and the cæcal portion, including the ileo-cæcal valve, was the part in which the inflammation was uniformly most intense, and to which it was often confined; in 13 cases there was no enteritis whatever, and in 16 there was no inflammation of the ileum, so that the ileum was inflamed in all but 3 cases where enteritis was present. On the other hand, in all the cases excepting one, namely, in 81 out of [illegible] cases, there were lesions indicating inflammation of the mucous membrane of the colon. In 39 the inflammation had affected nearly or quite the entire extent of this portion of the intestine; in 14 it was confined to the descending portion entirely, or almost entirely; in 28 cases, the records state that colitis was present, but its exact location was not mentioned.

We may add, that, in the quite numerous autopsies we have made after death from this disease, we have invariably found the large intestine involved, the inflammatory lesions being in some cases limited to it, while in others they also extended into the small intestines.

It is, therefore, clearly established, that in the inflammatory diarrhœa of children, inflammation of the large is considerably more frequent than that of the small intestine, and much more apt to exist alone. The lower end of the ileum is the portion of the small intestine which presents the most advanced and severe lesions; while in the large intestine the lesions are most marked in the caput coli, sigmoid flexure, and descending colon.

In our description of the lesions of entero-colitis, we shall divide them into those found in the acute and chronic forms of the disease respectively: a division made for the sake of correspondence with the [illegible] mucous membrane; an appearance which may sometimes exist in the duodenum, but far more frequently is observed in the lower end of the ileum and in the colon. More frequently it takes the form of arborescent congestion, occurring in patches surrounding the enlarged follicles. The peritoneal surface may also be more or less vascular, and quite frequently there are little patches of redness and arborescent vascularity, corresponding to the bases of the inflamed mucous follicles.

The thickening of the mucous membrane usually corresponds to the degree of vascularity, and when the latter is but slight, may be scarcely appreciable; while in other cases, and especially when associated with much enlargement of the mucous follicles and œdema of the submucous tissue, the thickening is highly marked. The inflamed portions of the mucous membrane are also more or less softened, so that they can be detached from the subjacent coats more readily than in health. In some instances the softening is so extreme that it is impossible to raise up the mucous membrane in strips at all. These lesions are all most frequent and marked in the lower part of the ileum, and in the descending part of the colon. In addition to these changes in the color, thickness and consistence of the mucous membrane, the mucous follicles are prominently enlarged. In the normal state, the isolated follicles of the mucous membrane of the intestine, in young children, appear as minute grayish-white bodies, and present a grayish point, the excretory orifice, which is only visible with the aid of a lens. In the course of entero-colitis, however, the morbid development which they undergo causes them to present the following characters. The isolated glands are enlarged, and seem, therefore, more numerous than in the healthy condition; they appear in the form of lenticular grains seated in the texture of the mucous membrane, sometimes projecting from its surface, sometimes not, and in other instances appearing to be situated beneath it; the excretory orifices of the follicles are often enlarged and tumid, and easily distinguished under the form of a grayish or blackish point in the middle of the gland; in other cases the orifices cannot be distinguished until slight pressure is made upon the crypts, when a drop of turbid mucus may be seen exuding through the open point. The color of the distended follicles is dull white, rosy, or yellowish; they are generally from one-third to two-thirds of a line in diameter. Dr. Horner (*Amer. Jour. Med. Sci.*, Feb., 1829) speaks of them, in this state of development, as resembling "small grains of white sand sprinkled over the mucous membrane, and about the size of a millet-seed."

The agminated glands or patches of Peyer are found in the same state of increased development; they are tumefied, and project above the level of the surrounding mucous membrane, and the orifices of the follicles are congested, so as to appear as dark points, giving to the patch a dotted, punctated appearance, which has been compared to the freshly-shaven chin.

A little later the enlarged follicles present minute, oval, or round yellowish spots upon their summits, which soften down and allow the contents of the follicles to be discharged. The enlarged orifice of the follicle will then admit a small probe, and may even measure one-half line in diameter. It leads into a little cavity, which is the follicular sac. The mucous membrane, which overhangs this cavity like a fringe, is thus undermined and partly cut off from its vascular supply, so that we may find a process of ulceration advancing in it until the base of the distended follicle is exposed, appearing as a small, oval, or round shallow ulcer.

These various conditions of the follicles may all be seen at the same time in a single portion of intestine. The enlarged patches of Peyer often have the appearance of being ulcerated, but a careful examination will generally show that this is not the case. The appearance depends upon the enlargement of the orifices of the glands, upon unequal tumefaction of the surrounding mucous membrane, and upon the presence, in the patch, of small, irregular, grayish points, consisting of pultaceous matter which makes the patch look more uneven and projecting than usual. If, however, the pultaceous layer be gently rubbed with a piece of linen it can easily be detached, when the mucous membrane beneath is found red, softened, and thickened, but not ulcerated. In comparatively rare cases however, there are superficial erosions of the mucous membrane, covering the prominent patch.

The exact date at which the ulceration of the follicles begins, is as yet undetermined, and probably varies greatly in different cases. It frequently happens, however, that death occurs, especially from the supervention of a choleraic condition, whilst they are still merely in a stage of enlargement. When, on the other hand, the disease passes into the chronic form, the lesions which we have above-described become more and more extensive. This is especially the case with the lesions of the large intestine, for it is even more true with regard to chronic than acute entero-colitis, that the chief seat of the disease is in the colon.

In chronic entero-colitis, the intestine is often contracted, and the peritoneal surface may present patches of discoloration. The thickening and infiltration have now affected the submucous and muscular coats, and have been followed by induration of the tissues, so that the walls of the intestine are often abnormally rigid. This is especially true with regard to the lower part of the descending colon and the rectum. The mucous membrane is seen to be riddled, not with mere superficial erosions, but with true ulcers, affecting the whole thickness of the membrane. These ulcers when isolated, are from one to one and a half lines in diameter, oval or circular in shape, and either have sharpcut edges, as though the piece of mucous membrane had been cut out with a punch, or the mucous membrane bounding them is undermined. Frequently, however, these ulcers coalesce, and at the same time extend in depth, so that large, sinuous irregular ulcers are formed, with thickened, slate-gray, undermined edges and having for their base either the submucous or muscular coats, which may be covered with a pultaceous, apparently pseudo-membranous layer of a grayish-white color. These ulcers surround and include irregular islets of mucous membrane, which are swollen, infiltrated, vascular, and discolored. That the large and deep ulcerations just described, even when most extensive, take their start from the mucous follicles, is proved by the frequent presence amongst them of other ulcerations of more recent date and smaller size, which present all the characters of the follicular ulcer, and show clearly the origin of the larger and more advanced ulcerations. Occasionally there is a marked deposit of pigment in the bases of the ulcers, and in some cases small coagula of blood have been found adherent to their bases.

We have already had occasion to allude to the marked analogy between the disease under consideration, and the form of camp diarrhœa described by Woodward (*op. cit.*); and one of the most powerful arguments in favor of the essential identity of the two affections, is the perfect correspondence between their anatomical lesions. We present below a summary of the microscopical changes in the intestine during the development of these lesions, as determined by the careful investigations of Dr. Woodward (*op. cit.*, p. 246). In the early stage, attended merely with thickening and softening of the mucous membrane, microscopic examination shows marked multiplication of the connective tissue cells about the base of the follicles, and soon the tissue is occupied by great groups of small, rounded, or slightly polygonal cells. The delicate layer of muscular tissue immediately beneath the base of the follicles, presents, at first, enlargement and proliferation of its nuclei, whilst later it often ceases to be recognizable, being obscured by the luxuriant cell-growth. In the most intense cases, the cell-growth here described as attained toward the surface of the membrane, may take place throughout its whole thickness, and even involve the subjacent muscular layer.

A similar proliferation takes place in the connective tissue, which lies between the follicles. The epithelial layer, which invests the mucous membrane, and is prolonged into the tubular follicles, either is the seat of rapid cell multiplication, or is exfoliated and replaced by round granular cells from the adjacent connective tissue cells. The epithelial lining, near the orifice of the follicles, appears to undergo these changes most readily and with the greatest rapidity.

The *closed* follicles also present rapid cell multiplication, which affects the parenchyma of the follicle, as well as the connective tissue of its capsule and the surrounding cellular tissue. Microscopic examination then shows the follicle distended with small, rounded, granular cells, and imbedded in a luxuriant growth of similar cells, which render it almost or quite impossible to draw the line where the follicle terminates and the surrounding connective tissue begins. "Ulceration usually appears to originate in the rupture of one of the closed follicles, and the discharge of its softened contents into the intestinal cavity. This is followed by the liquefaction of the intercellular substance, and the consequent liberation of the broods of minute cells, into which the surrounding connective tissue has been transformed. Hence results one of the punched-out ulcers described above. In the subsequent extension of the ulceration, by which large, irregular, sinuous ulcers are produced, the progress seems to take place chiefly in the submucous connective tissue, the superficial part of the mucous membrane resisting the process until undermined, and its nutritive supply cut off. Hence arises the excavated undermining character of the edges of the ulcers. From the anatomical point of view, it will therefore be perceived that the morbid process, in the cases in which some hours or days before death, but being sufficiently pervious to the food to pass, the symptoms of obstruction were lacking."

The *Mesenteric and Mesocolic Glands* are nearly always enlarged, most marked enlargement corresponding to the lower end of the and the descending colon. The enlarged glands are of a pink color, rather more soft and succulent than normal.

*Stomach.*—In the great majority of cases the stomach is quite in a few instances, however, there may be found congestion of the membrane, slight enlargement of the mucous follicles, or softening mucous membrane, probably cadaveric in most cases.

*Liver.*—Many authorities, apparently led by the presence of supposed to indicate disturbance of the function of the liver, have that there is in most cases of entero-colitis some morbid condition of organ, but extended observation has disapproved this view.

Thus Hallowell (*Amer. Journ. Med. Sci.*, July, 1847) found, that in cases, the liver was affected in but 1 case, when it was enlarged: Smith (*op. cit.*, p. 370) has published the result of 32 post-mortem aminations in regard to this point, which confirm the same Thus, he states, "there was no evidence from the post-mortem ances of the liver in these cases of any congestion, or torpidity, or activity, or perverted secretion. The size of the liver was in some very different in those of about the same age, but probably there greater difference than usually obtains among glandular organs the limits of health. In most of the cases the liver was examined scopically, and the only fact worthy of note observed was the amount of fatty matter. Sometimes it was in excess, sometimes in erate quantity or rather deficient, and sometimes in greater amount one portion of the organ than in another."

The thoracic viscera present no constant or important lesion, reat obscurity. We are now pretty well acquainted with the physical onditions under which the disorder is most apt to be developed. Early ge, the period of dentition, high temperatures, improper food, residence cities, and especially the crowded occupation of small and illy venti-ted buildings, in narrow courts and alleys, where unhealthy exhalations rise from the decomposition of filth and dirt of all kinds, are the chief onditions which precede the outbreak of the disease. But how these onditions act to produce their effect is still a matter of doubt. To at-empt to reason upon a matter so full of difficulty seems almost useless, nd yet we shall venture to place before the reader some thoughts we have ad upon the subject.

There are two broad generalizations which we think, may be safely as-umed to be true. 1. An unhealthy food, one incompetent to furnish to the ody what it needs for the purposes of nutrition, as farinaceous food or un-ealthy milk, is sure to produce the disorder we are considering, no matter ow favorable may be the circumstances, in all other respects, in which the hild is placed. 2. The best breast-milk in the world, or the most correct rtificial diet, will not save a child from this disorder, who is located in an ll-ventilated house in a dirty and filthy quarter of a large city during ot weather. Here the heat to which the child is exposed, the heavy air aded with foul exhalations which it breathes, determines a condition of he health in which the digestive organs can no longer digest properly the od offered them. In both cases the same result is produced. In the rst, the stomach cannot change the originally improper character of the od into healthy material. In the second, the diseased and enfeebled rgan loses the power to digest even proper food. In both the ali-entary canal is filled with the products of an improperly digested food. Vhether these unhealthy products in the alimentary canal act chiefly as cal irritants to the mucous membrane, and thus determine the tissue-hanges met with; or whether, as Rilliet and Barthez suppose, some mor-id condition of the blood is brought about, which of itself gives rise to he changes in the mucous membrane through a morbid action of the dis-ased blood on the nervous system, and particularly on the sympathetic erves, we cannot say. Most probably they act in both ways, and the esultant effects are the consequence of the two trains of diseased action et up, the local and the general.

In either case a constitutional condition is brought about, the essen-ial feature of which is a slow innutrition or inanition. It is altogether robable, moreover, that a condition partaking of the scorbutic, must be nduced, so that we have, after the disorder has lasted for several days r weeks, the general debility of a slow inanition, and blood-alterations hich resemble those of scurvy.

SYMPTOMS; DURATION.—In infants the *acute* form of entero-colitis enerally begins with restlessness and fretfulness. The mother observes hat the child sleeps less than usual and for shorter periods, and that its leep is uneasy and broken by sighing or moaning, or by occasional ex-ressions of pain flitting across the face. It takes the breast less fre-uently, and is satisfied to nurse for a shorter time, showing thereby an evident diminution of appetite. At the same time it is apt to reject its milk in larger quantities than usual, and this is often observed to have a very acid smell. After these symptoms have lasted a few days, and sometimes without them, the peculiar symptoms of the disease, the diarrhœa and other abdominal symptoms, make their appearance, and are accompanied by febrile reaction in most cases.

In older children the acute form may come on suddenly, with diarrhœa, loss of appetite, thirst, sometimes vomiting, abdominal pain and fever, from the first; or, as happens very frequently, the case begins with slight diarrhœa, unaccompanied by fever, or other signs of sickness, and it is not until after several, or eight, ten, or even more days, that signs of inflammation make their appearance.

After the disease is established, the most important symptoms are the following. The *diarrhœa*, which is the most prominent and characteristic, presents various characters. In order to appreciate this symptom as its importance requires, the practitioner ought always to see the napkins of the child at least once, and often more frequently, in the day. It exists in almost all cases of entero-colitis, in the erythematous and follicular inflammations, and in the ulcerations and softening which accompany or succeed simple inflammation. It is seldom absent, and yet that it is so sometimes, is proved by the facts mentioned by MM. Rilliet and Barthez, who state that they have calculated, from their cases, that it is wanting in about one of every twelve cases of inflammation or softening of the intestine. They add, however, that it is absent only in slight attacks, and is always present when the disease is severe. It varies greatly as to the frequency, abundance, and character of the stools. It varies also in its mode of progress, so that it presents great differences as to all these points from day to day, and at different portions of the same day. We may remark in general, however, that in proportion to the severity of the inflammation, so is the diarrhœa violent and constant, and that it usually increases as the signs of inflammation become more and more marked. It is rare to have severe diarrhœa when the anatomical lesion is of slight extent, though this does sometimes happen. The *number* of the stools, as has been stated, is exceedingly variable. This depends in great measure upon the violence of the case; for, while in those which present the symptoms of an inflammation of small extent, the stools seldom amount to more than six or eight a day, in those in which the evidences of more extensive and severer inflammation are present, there will be fifteen, twenty, twenty-five, or even more per diem. The *consistence* of the stools may vary between that which characterizes them in a state of health, and that of the thinnest serous fluid. The *materials* of which they are composed consist chiefly of mucus, bile, serum, small portions of feculent matter, portions of undigested caseine or other food and blood. M. Bouchut (*loc. cit.*, p. 219) describes those of very young children as presenting the following characters.

1. They are semifluid, homogeneous, greenish, and similar to cooked vegetables; neutral.
2. Semifluid, homogeneous and green; often acid.

3. Semifluid, heterogeneous, greenish, and mixed with yellowish fragments of ordinary fæces; neutral.

4. Semifluid, heterogeneous, greenish, and mixed with fragments of undigested caseine; acid.

5. Diffluent, greenish, heterogeneous, composed of a large quantity of water in which float yellowish and greenish or whitish particles; acid.

6. Diffluent, greenish, like the preceding, and mixed with gas of a mawkish and sometimes sourish smell.

7. Diffluent, completely serous.

8. Bloody stools are very rare at this age. We have met with them once only in a child affected with acute hepatitis.

Such are the appearances of the stools in children who have not completed the first dentition. After the epoch of the first dentition the disease becomes much more rare, and when it occurs, is generally of a milder character, so that the discharges differ less from their healthy characters. Under these circumstances, they are usually less frequent, not often exceeding six, eight, or ten in the day, and retaining generally their yellow color or becoming brownish; they are commonly of a semifluid consistence, and may be called bilious. When, on the contrary, more frequent, they become fluid, abundant, mixed with mucus, and are either of a light yellow or brownish, or more rarely, of a greenish color. In some cases there are, in addition to the substances mentioned, pus, which indicates ulceration of the lower portion of the intestine, and fragments of false membrane. Moreover, it is very common in older children to observe traces of blood in the stools, sometimes in considerable quantities. We may remark that we have several times met with stools containing blood in children within the year, but much less frequently than after that age. The presence of blood generally coincides with small and frequent stools, attended with much straining, and often severe pain, and almost always indicates follicular inflammation and ulceration of the large intestine.

The serous fluid alluded to sometimes constitutes the whole of the discharge, so that the napkins are merely wetted through, without any or but a very small quantity of solid matter being left upon them. This kind of stool is very frequent in the cholera infantum of this country. The *odor* of the stools is important. In the beginning, while the discharges still retain some of their natural characters as to color and consistence, it is often very offensive, but as the case goes on, and the greenish color predominates, it is either sour, or becomes very slight. In some violent cases, in which the discharge consists of a watery, dark-brown fluid, the odor is fetid.

After diarrhœa, the most important symptoms are those which concern the *form*, *size*, and *tension* of the *abdomen*, and the presence or absence of *pain* or *tenderness* on pressure. In infants the abdomen is more distended than usual; but, according to Bouchut, the tension depends on the muscular effort made by the child to resist the hand of the physician. He says that when it is carefully examined, while the attention of the child is attracted in some other direction, it is found to be soft and supple, and rarely painful to the touch. In older children it is, in many of the body, when, if the crying and shrinking depend on fear or nervous excitation, they will be as violent as when the abdomen is touched. Pain to the touch is an important symptom, as it is very generally indicative of acute enteritis. *Gurgling* is rare, according to MM. Rilliet and Barthez, in ordinary entero-colitis, though very generally present in typhoid fever.

*Vomiting* is very common in young infants, and is generally repeated several times a day. In severe and rapid cases it is a very troublesome and alarming symptom. In older children it is much less common, and is never really violent, except in some of the most acute cases. In these it is confined to the first few days of the attack.

After the diarrhœa is fairly established, young infants are almost always either very irritable, peevish, and restless, or weak, languid, and subdued. Their slumber is short and disturbed, and generally they sleep much less in the twenty-four hours than when in health, unless under the influence of anodynes. Older children are generally somewhat restless and irritable, but much less so than infants. There is seldom any disorder of the intelligence, though in acute cases there is sometimes slight delirium or headache. *Fever* exists in all acute cases. It is seldom continuous in infants except for the first few days, after which it almost always assumes the remittent type. It is marked by increased frequency of the pulse, which rises to 120 and 140, or in bad cases much higher; by heat of skin, often intense during the exacerbations ; by thirst and diminished appetite; and by dryness and heat of the mouth. In older children the pulse is not generally so high as in infants, and in many of the mild cases the fever is very slight or there is none at all. In acute cases, however, it is sometimes continuous and marked by rapid pulse and great heat of skin.

The *tongue* is generally normal, though sometimes red on the edges and tip in acute cases. It is seldom dry, except during the fever. The *appetite* is almost always lost, and the *thirst* generally increased, though to a less degree than in diseases of the stomach.

with bluish circles, and the whole appearance of the child is that of misery and exhaustion.

In infants it is very common to meet with erythema of the buttocks and thighs, produced by the contact of the acrid stools and urine with those parts. This symptom is said by Bouchut to exist in five-sixths of the cases. We feel quite sure that it does not exist in so large a proportion of those which occur in private practice, though we have met with it in numerous instances. When severe it is generally accompanied by papules, which ulcerate after a time and form superficial ulcerations upon the skin. These ulcerations sometimes run together and become of considerable size and depth. In the form of the disease met with in the children's hospitals in Paris, erythema and ulcerations of the heels and internal malleoli are also met with, and constitute a serious complication in the case. They are said to depend on want of cleanliness, and the rubbing together of the feet of the child, unprotected by covering. We have never met with them in private practice.

The *duration* of the disease is stated by the French writers to be generally about fifteen days, at the end of which time convalescence is usually established. It may be shorter or longer. According to our own experience it is entirely uncertain. Most of the cases that have come under our notice have been rather shorter. The disease subsides gradually. The number of stools diminishes; they become less abundant and more consistent, and return to their natural color and odor; the pain on pressure, and the enlargement and tension of the abdomen disappear; and as this occurs, the fever subsides, the appetite returns, the temper improves, and the child enters into full convalescence.

The *chronic form* of entero-colitis generally follows the acute, though it sometimes presents many characteristic features from the first. It differs from the acute form chiefly in the absence or the much slighter degree of fever and other constitutional symptoms in the early stage. The diarrhœa is less abundant and less frequent. At first the child retains its spirits and many of the signs of health. But gradually its strength fails, the temper becomes irritable, the complexion grows dark, sallow, and unhealthy, the skin becomes dry and harsh, and, in consequence of the emaciation which takes place progressively with the other symptoms, hangs in folds around the shrunken extremities, or is drawn tightly over the joints and other osseous protuberances. The tongue is generally moist and natural, though in some cases red and dry, whilst in others it, together with the lips, partakes of the pallor which pervades all parts of the body. The abdomen is usually distended and sonorous on percussion, and may be painful or not on pressure in different cases, or in the same case at different periods of the disease; its parietes sometimes offer no resistance to the touch, so that the intestinal convolutions may be readily felt by the hand, or even between the fingers; and in some cases we have seen them so thin and relaxed, though the abdomen was more prominent than natural, that the outlines of the intestines, and even the peristaltic movement were visible upon the exterior. The appetite generally persists in spite of the gravity of the disease, and is sometimes will often improve greatly for days or weeks, and then suddenly relapse into as bad a condition as ever. In favorable cases these remissions become more and more frequent, and the symptoms gradually improve until at length the child is restored to health. In fatal cases death is occasioned by the utter deterioration of the general health which occurs, and the child perishes worn out by long illness, or, as most frequently happens, some complication arises which hurries on the fatal event. Thrush is a frequent complication of chronic entero-colitis, and doubtless often hastens the death by the impediment which it occasions to the nursing or feeding of the child. Vomiting has almost always occurred towards the close of the fatal cases that we have seen, especially those in which extensive thrush was present.

The *duration* of this form is of course very uncertain. It may last for weeks or months. We have known it to last two and three months in several cases, and in two others it lasted with occasional intermissions in one a year, and in the other eighteen months.

Diagnosis.—The diagnosis of acute entero-colitis is not difficult. There is no disease with which it is likely to be confounded. The characteristic features of the malady are the diarrhœa and other abdominal symptoms and the absence of signs of other disease. The secondary cases are distinguished by the occurrence of the usual symptoms of entero-colitis during the progress of the primary malady.

The chronic form is not likely to be mistaken for any other disorder unless it be the diarrhœa which occurs in tubercular disease, from which it is to be distinguished by the presence in the latter of the signs of tuberculosis of other organs.

Prognosis.—Acute entero-colitis is always a serious disease in infancy. The prognosis will depend in great measure on the circumstances under which the affection has been developed. It is much more unfavorable in a child fed on artificial diet, either wholly or in part, than in one who is nursed at a fine breast of milk. It is more unfavorable also in weak and prognosis is, as a rule, favorable. The disease is seldom dangerous when it occurs as a primary affection, while, as a secondary affection, on the contrary, it is much more apt to be serious.

The unfavorable symptoms are: great frequency of the stools; collapse; violent vomiting or retching; and dangerous cerebral symptoms, as coma, rigidity of the limbs, paralysis, or convulsions.

TREATMENT.—The *prophylactic treatment* is very important. It includes attention to *habitation*, *diet*, *dress*, and *exercise*. The most frequent causes of entero-colitis are high summer temperatures, residence in an unhealthy locality, and improper diet. A child may have been born of the most healthy parents; may be living, if an infant, on the most healthy food in the world, the milk of a perfectly sound woman, or, if it have been weaned, on the best possible substitute for breast-milk, one selected by the most consummate medical art; and yet, if it be the unfortunate resident of some low, crowded, and unclean part of any of our cities in the summer season, it has but small chance of escaping inflammatory diarrhœa or cholera infantum, to be followed by chronic diarrhœa. Or, a child may be living in the best part of these cities, with every advantage that wealth and the medical art can give, and, if in the period of the first dentition, and the summer heats be great, it will be only too apt to have some form of the disease we are considering. Under the latter circumstances, its chance of escaping the disease will be vastly greater than under the first-named conditions, but the true prophylaxis is, where the parents are so situated as to be able to do that which is best for the child, removal from the city during the hot season (from the early part of June to the last week of September) into some cool and healthy region of country. We have long thought that the best region to spend the summer in is a somewhat high and cool part of the country, where the breezes have full sweep, and where the topography is such that water runs off rapidly, or sinks fast into the soil. The seaside, if it be a point where there are no marshes and no malaria, and where the supply of milk and other wholesome food is abundant, is an excellent place. We have seen more remarkable sudden effects from the removal of a dangerously sick child to the seaside, than from a change to the interior; but, nevertheless, for a continued residence of three months, we prefer a high interior locality.

On the other hand, if a child be placed in the most favorable possible condition as to locality, and the diet be a radically bad one, a deficient or unhealthy breast, improper artificial diet, or a foolish allowance on the part of the mother or nurse to the child of a variety of vegetables, of fruits, and especially of berries like currants or gooseberries (and we have known such things), it can scarcely escape the penalty of a fit of illness more or less severe.

A child who is so unfortunate as to get a sharp attack of entero-colitis in June or July, is very apt to continue more or less sick during the rest of the summer, so that the true prophylaxis is to take it away from the city early in June to avoid this danger, and not to return until after the September heats are over.

As the reasons for decisive medical action in any disorder cannot be [illegible] the causes and treatment of diarrhœa and dysentery, whic read without being impressed with the similarity (saving those diseases to the one we are describing. At page 304, D "But in others the disease progressed, became follicular, and ative. In the treatment of these, great difficulty was expe the fact that the patient was still exposed to the causes of and it came to be a fixed doctrine at Southern and Southwes that confirmed cases had no security for cure except by re North. This soon became a governmental policy, and hosp tablished in New England, along the Lakes, and in the which chronic cases were sent in great numbers. Among thus removed, but treated in Southern hospitals, much va irresolution were exhibited in the prescriptions of surgeons in all diseases, the treatment of which by drugs is usually To trace the history of an individual case was to find that t had run the round of all remedies, from opium to astringents gents to quinine, from quinine to bismuth, and from bis vomica, from nux vomica to mercurials, returning almost alw as the drug, which at least alleviated, if it did not cure."

The *dress* ought to be suited to the weather. It is best to child, even in hot weather, a very thin and soft flannel shir sleeves. This should never be removed. A young infant sh summer long a thin and light flannel petticoat. A child a have the flannel petticoat removed for a few days when the rises to above 85° or 90°, when it suffers evidently from the soon as the temperature falls to 85° or below, the petticoat placed. This happens only for a few days in our summer sea change should be made with great care, and only under the of an intelligent and watchful mother or nurse.

*Exposure to the open air* is another point in the proph ment which is of great importance. In country houses in th ssible. The best plan is to go in the morning and return in the even-g, resting through the middle of the day at some point where the child n take the rest and midday sleep, which are quite as important as fresh r. Included in this subject is that of *exercise*. This becomes very im-rtant when the child is old enough to walk and run, for then an ignor-t or thoughtless woman might think the more exercise the better, hereas it is necessary to watch such children very carefully, since, if ey are allowed or enticed to take undue exercise, the resulting fatigue comes a positive cause of diarrhœa. A child of two or three years old ould never be induced to take long and continuous walks; it ought to isk and play, not walk straight ahead, like a man in training; for that nd of exercise, we have remarked, never suits children well.

It has already been stated that one of the most frequent causes of the alady is the attempt to bring up the child on artificial diet, and particu-rly on one of an improper kind. It is clear, therefore, that to avoid the isease it is necessary that the child should, if possible, be nursed. If this annot be done, the diet ought to be wisely selected and regulated in all s details by the physician. The one most proper is evidently that which ost closely resembles the natural aliment of the infant. For directions s to diet, we must refer the reader to the remarks upon diet at page 297, here we have discussed this point quite fully.

*Diet in the Attack.*—After the disease has made its appearance, the diet ould be very carefully regulated. This constitutes, in truth, the most portant point in the treatment. If the child is nursing, it ought to be nfined entirely to the breast, and should the nurse have a large quan-ty of milk, and the stools exhibit considerable quantities of undigested aseine, it must be somewhat restricted as to the frequency and length of me it is allowed to nurse; in other words, it must be moderately dieted r two or three days. Should there be the least suspicion that the ilk of the nurse is unhealthy, it ought to be examined as before di-ected, and, if found unhealthy in any respect, a new nurse must be pro-ided. If the disease comes on shortly after weaning, and persists for everal days in spite of careful diet and treatment, it is safest to restore he child to the breast. When this cannot be done, we must select that rm of artificial diet which seems most suitable. The best is, in our pinion, the cow's milk prepared with the solution of gelatine in the man-er already recommended, but made very weak for a few days. We have ften found it necessary, under these circumstances, to add four and even ore parts of water to the milk, instead of two or equal parts, as is the sual custom.

In older children the diet, for a few days, ought to consist of simple ilk and water, or of thin preparations of arrowroot, rice flour, sago, pioca, or wheat flour, made with milk, or milk and water, with small uantities of bread, or, if the child refuse such articles, panada, or light hicken or mutton water may be allowed. The quantity of food, what-ver it be, must be determined very much by the child's instincts. When he appetite continues, we can seldom go wrong in allowing as much of hese simple foods as the patient will take. Still, the physician ought to know accurately the amounts that are given, and if he finds the taking a full healthy average, or more, it will be best to restrict the tity somewhat, and offer water frequently, on the supposition little patient is taking its liquid food more from thirst than else increase the water of the food, if he have reason to believe solid matter is in too large a proportion.

THERAPEUTICAL TREATMENT.—We have found a large number mild cases that have come under our notice to recover under very treatment. When the patient is an infant at the breast, before the of dentition, the simple direction not to allow it to nurse as usual; the use of a warm bath morning and evening, if the skin be and the child restless and fretful; the administration of a small castor oil (half a teaspoonful to a teaspoonful), or of spiced syrup barb in the same quantity, with half a drop to a drop of laudanum, beginning of the attack, to remove any undigested food that may be in the bowels, followed in one or two days, if the disorder continues, some simple astringent remedy; generally suffices to effect a cure. on the contrary, the case depends on an unhealthy or insufficient when the child subsists entirely on artificial food, and when the coincides with the process of dentition, the attack is kept up and vated by these causes, and it is more difficult to obtain a cure. former case the diet is, of course, of all importance; in the latter the must be carefully examined, and if found to be swelled and inflamed the teeth near the surface, they should be freely incised. After matters have been attended to, the kind of treatment will depend the character of the general symptoms and the violence of the disorder.

When the pain is violent, the discharges frequent, painful, and with mucus, muco-pus, or blood, and the abdomen tense and painful touch, moderate local depletion by leeches may be used with and safety in vigorous children. The leeches are best applied lower part of the abdomen. About six or eight American leeches, or foreign ones, may be applied at the age of one or two years, so as to about two ounces of blood. Of late years, however, we have ployed depletion so much as formerly, but use instead warm baths, tices to the abdomen, or warm stupes, and refrigerant medicines. doses of the sulphate of magnesia and laudanum are very useful; may employ spirit of nitrous ether, or solution of the acetate of with paregoric or laudanum, or the following mixture:

℞.—Sodæ Bicarb., . . . . . . . ℥ss.
Mass. Hydrarg., . . . . . . . gr. iij.
Tr. Opii Camph., . . . . . gtt. L vel f℥j.
Syrup. Simp., . . . . . . . f℥ij.
Aq. Mentha, . . . . . . . f℥xiv.—M.
Dose, a teaspoonful every three or four hours.

The warm bath, used at a temperature of 95° to 97°, twice or day, is most excellent. It is a good plan to wrap the child, immediately ng taken out of the bath, in a warm muslin sheet, and over this a light nket, and let it lie on the lap or bed for twenty minutes or half an hour. e hot poultice or stupe recommended above, should be covered with led silk, secured by a towel pinned around the body, changed every ree or four hours, and kept on for the greater part of the day, or for veral days.

*Calomel* has been so highly recommended and so long employed in ese cases, that we feel some hesitation in saying how often it has dispointed us. Certainly we have found in many children that it was of evident use, and in the old-fashioned doses of a grain or half a grain, think it only adds to the irritation of the bowels. In doses of the elfth and eighth of a grain, with chalk and opium, every two or three urs, we formerly thought it was sometimes useful, but we cannot resist e impression which years have given us, that the useful agents in these stances, have been the chalk and opium, and especially the opium. ne blue pill mixture, recommended above, we still put trust in. Why ne pill should answer where calomel irritates, we do not pretend to exain, but such is the opinion to which experience has led us.

Before quitting this question of the use of mercurials in diarrhœa, we ish to quote the results at which some of the more modern observers ve arrived, with the remark, as we pass on, that our own conclusions ere much the same ten years ago as those expressed above. We shall this even at the risk of being tedious, for we think the point a very imrtant one. In the first place, we shall quote the opinion of one of the lest of the United States army surgeons, as to the use of this drug ring the late war. The writer (*Outlines of the Camp Diseases of the nited States Armies as observed during the Present War*, by J. J. oodward, M.D., Philadelphia, 1863), in the article on Chronic Diarœa, a disorder closely akin in many of its symptoms and anatomical sions to the entero-colitis of children, says at page 262: "Among the medies liberally employed in chronic diarrhœa, is one group which can ly be mentioned with disapprobation. This is the mercurials, which are o frequently administered to gentle salivation in the form of blue pill or lomel, combined with opium and ipecacuanha. The authority of some the most distinguished American medical writers is in favor of the ployment of mercurials in the chronic diarrhœa of civil life; yet when is remembered that even those modern writers, who most warmly adcate their general employment in the treatment of inflammation, recomend them to be discontinued as injurious whenever the process has ne on to ulceration, it would appear that even sound mercurialists would oid using them in the form of chronic diarrhœa, which is most common the army.

"Practically it will be found that although in some cases mercurials may cceed, as much less dangerous remedies would have done, in checking e progress of the disease, yet that in the majority of cases their employent is accompanied by an increase of the debility, the loss of appetite, e anæmia, and the general constitutional symptoms, without any dimiation in the frequency of the stools. They are, therefore, to be regarded four to six grains,

to the child's age, may be given every three hours. This is a ary powder, but it is right to say that I have in a good many lately left out the calomel, and the case has done just as well, if without it."

Dr. J. L. Smith, of New York (*op. cit.*, p. 379), says nothing about mercurials in his article on the treatment of inflammatory from which we are led to suppose that he does not use them. ever quotes Dr. E. H. Parker as giving, when the condition that of dysentery, a mixture consisting of about ten grains of rubbed up in two drachms of syrup of rhubarb, to which is half teaspoonful of paregoric, and four ounces of chalk mixture. the dose is a teaspoonful every two or three hours. Dr. Parker the "blue mass certainly does not act like the calomel, not purgative doses so great prostration, and in small doses it does the proportion of fibrin in the blood, as is the case with calomel." Smith's comment on this is: "I have never used this mixture. been generally satisfied with the effects of the castor oil mixture."

It is unnecessary to say any more upon the use of mercurials, especially of calomel. We have quoted enough to show that opinions find us in very good company.

We regard *opium* as one of the most valuable remedies we have treatment of this disease. In the last edition of this work it was that some writers objected to its employment in the early stage jurious, but that we had not been deterred from using it, except presenting manifest signs of cerebral irritation in connection febrile symptoms; but that when there has been nothing more tability, restlessness, and insomnia, when there was evident pain the discharges, and when the latter have been very frequent. always made use of some of its preparations without hesitation, tainly without injury, but on the contrary, with very great benefit. longer experience confirms us in this view and practice. The isorder, we find nothing which answers so well our purpose as this remedy. When, however, there is unusual quiet, tending towards drowsiness or stupor, with contraction of the pupils, we make use of it only with great caution and in very small doses. We are glad to find that Dr. Stokes also employs opium without hesitation. He says, "it is a remedy that requires caution in its exhibition, but one of great utility." It generally lessens the number of discharges, and very often diminishes the heat of skin and frequency of the circulation, by allaying the irritability of the nervous system, while at the same time it greatly promotes the comfort of the child. We have used it in the form of laudanum or paregoric, given in combination with a laxative early in the case, or by enema, and afterwards in that of the Dover's powder or powdered opium. For a child under six months old half a drop of laudanum is enough to give by the mouth. Of the Dover's powder about a sixth or eighth of a grain may be administered mixed with two grains of chalk, to be repeated every two or three hours until three or four doses have been taken, or until the child shows some degree of drowsiness from the action of the opium, after which it ought to be suspended for six or eight hours, and then resumed. Or the opium may be given in the form of laudanum combined with the sulphate of magnesia as recommended above. The old-fashioned castor oil emulsion, in the proportion of one drachm in a one or two-ounce mixture, with half a drop of the deodorized laudanum to each teaspoonful of the mixture, is often very soothing and beneficial. When there is marked tenesmus, with frequent small evacuations, opium may also be used with great advantage by the rectum, either to the exclusion of any in the mixture, or in addition to that, taking care to graduate the quantity by the degree of drowsiness that may be induced. At one year two drops in one or two teaspoonfuls of water or thin starch-water may be used two or three times a day. In such cases, suppositories are sometimes retained better than enemata. A twelfth to a sixth of a grain of powdered opium made up with cocoa butter, may be given instead of the injection.

Generally speaking the acute constitutional symptoms either subside or disappear under the above treatment, and very often the diarrhœa also ceases and the child recovers. When, however, the diarrhœa persists, it is necessary to resort to two other classes of remedies, upon which great reliance is placed in the treatment of this affection. These are *astringents* and *absorbents*, of which the most important are prepared chalk, powdered crab's-eyes, acetate of lead, rhatany, kino, and catechu. The chalk may be used in the form of the officinal mistura cretæ, a teaspoonful of which is given after each loose evacuation, or several times a day. When the case is severe, the efficacy of this remedy is much increased by the addition of tincture of krameria, in the proportion of a drachm to two or three ounces of the mixture, of some opiate preparation, or of ten or fifteen drops of the aromatic syrup of galls (to be described presently) to each teaspoonful. Chalk may be used also with great advantage, as stated above, in powder, combined with Dover's powder.

The powdered *crab's-eyes* will sometimes arrest cases in which prepared tween the acts of vomiting, the little thing refuses almost everything is brought to it, all its usual foods, medicines, and sometimes even it is evident that the child has a more or less positive sense of which causes loathing of food, and the symptom becomes a serious plication which requires special attention and treatment. In such there is no use in forcing food or drugs which it loathes upon the unless all other means have failed, when of course, we must to make it take concentrated foods in small doses. The better at first, is to change the diet in toto—to abandon milk and all its rations for two or three days, if these excite disgust—and give light or chicken tea, just touched with salt, or raw beef, or, if this also fused, cold extract of beef in one or two tablespoonful or wineglass quantities, or pieces of juicy and rich beef very slightly cooked. sucked. Or we may try small portions of yelk of egg, hard boiled what we have often found was eagerly taken in such conditions, whey, of which we have given, in the second year of life, as much tumblerful in twenty-four hours, and this without the slightest effect undue stimulation, febrile heat, or excitement. Sometimes, when child refuses its ordinary milk persistently, or vomits it so soon as it will drink willingly, and retain very well lime-water and milk. proportion of one of the former to two or three of the latter, with enough brandy to change the taste. We know that some medical object entirely to the use of stimuli in children on two grounds: 1. T alcohol has no remedial power whatever, or that it is positively inju in all cases. 2. That its use tends to produce that pernicious taste stimulants which engenders the habit of drunkenness. To the first jection we can only reply that our observation and experience have to a different conclusion, and that, when employed in certain condi of the vital powers, which we have carefully endeavored to descr degree of severity of the case. At the age of six months, from ten to fifteen drops may be given every two or three hours in two or three ounces of the lime-water and milk; and at one and two years, from twenty to twenty-five drops in from four to six ounces of the milk food every two, three, or four hours. It may be a sign of the old Adam in the poor little sufferer, but we have often known children to take, for days together, milk with brandy in it, who would not touch the milk without this addition. We cannot but think that in such cases it is an instinct for a useful agent, like the appetite of patients in typhoid or typhus fever, in certain of their phases, for wine or brandy, which disappears when the necessity for it passes away, as has been so well described by Dr. Corrigan, of Dublin, in his able little essay on the treatment of Irish typhus.

Under these circumstances, all medicines which disgust the child must be laid aside. A bitter, or nauseous, or gritty dose will, in such states, surely cause vomiting, as will, in older persons, under such conditions, an odor or taste, or even an idea. We have seen a little infant, sick with diarrhœa, who was sitting languidly upon the floor, made to gag and retch, by chancing to pick from the floor a piece of softened bread. The impression produced upon the tactile sense of the fingers by the wet and mushy substance caused sickness at once, as the filing of a saw sets the teeth of a delicate nature on edge, and brings water into the mouth. All offensive and bitter doses must be abandoned therefore. We have often used, in such cases, the following prescription with much benefit:

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| ℞.—Liq. Morph. Sulphat., . . . . . | ♏xxxij. |
| Acid Sulph. Dil., . . . . . . . | ♏xv. |
| Curacoa, . . . . . . . . . | fʒij. |
| Aquæ, . . . . . . . . . | fʒxiv.—M. |

Dose, a teaspoonful every hour or two hours, at the age of six months to a year.

For older children, the proportions of the opiate and acid must be increased. When the nausea subsides or passes away, or when the child becomes drowsy, the intervals between the doses must be lengthened, and as the symptoms disappear, the other remedies necessary for the diarrhœa may be resumed, and so too of the food. Dr. J. L. Smith, of New York, states that the best remedy he has used for vomiting is the neutral mixture, as follows:

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| ℞.—Potass. Bicarbonat., . . . . . | gr. xxv. |
| Acid Citric, . . . . . . | gr. xvij. |
| Aquæ Amygd. Amar., . . . . | f℥j. |
| Aquæ, . . . . . . . . | f℥ij.—M. |

One teaspoonful to a child from eight to twelve months old, repeated according to the nausea or vomiting.

Creasote is also sometimes very useful. Dr. Smith says that in the Nursery and Children's Hospital of New York, this remedy is used, given in the proportion of an eighth of a drop in a teaspoonful of lime-water, or a teaspoonful of milk or breast-milk, and has been found successful in certain proportion of cases.

in the acute form will apply here. If the child have been weaned a few weeks before the time at which we are consulted, and the case be serious, it is better to advise the procuring of a wet-nurse. We several times known cases of the disease which had resisted the carefully managed artificial diet and therapeutical treatment, reco a few days after the child had been restored to the breast. It is however, impossible to follow this course, from the refusal of the pa to obtain a nurse, or of the child to take the breast of a stranger, an are obliged to rest content with artificial food. We believe that th of diet which suits the largest number of children is one of milk. Dur number of years past, we have found the gelatine food, already des to answer better than any that we have ever essayed. It ought to be very light and thin. About a scruple of gelatine should be diss boiling in half a pint of water. Towards the end of the boiling, a cow's milk, and a teaspoonful of arrowroot made into a paste wi water, are to be stirred into the solution, and from one to tw spoonfuls of cream added just at the termination of the cooking. then to be sweetened moderately with white sugar, when it is re use. The whole preparation should occupy about fifteen minutes.

When cow's milk, mixed with water alone, or prepared in the ma just recommended, evidently disagrees, we have sometimes found with water alone, or better still, with the solution of gelatine in wa the proportion of one part of cream to five or six of the latter, to very well. In other cases very carefully prepared beef-tea or chick mutton water, given several times a day or but once, according t taste and fancy of the child, will answer better. It sometimes hap that the child will refuse everything that has been mentioned, and ye prostration and emaciation are such as to make it essential to p some aliment that it will consent to take. We have, under such ci stances, given small portions of bread and butter, or stale sponge with weak brandy and water, if the child is old enough to swallow food. Sometimes it will eat small quantities of salt, or prepared in the manner described below,[1] and have found it to be readily digested and to agree well with the little patients. There is another article which we have sometimes given when children have been exhausted for want of food, and when they require constant change in order to be tempted to take it. This is the yelk of a *hard*-boiled egg, which has the advantage of being very nutritious if digested, and of not being injurious should it happen to pass into the bowel in the crude state, as it falls into a state of fine powder, which is not irritating to that organ.

The quantity as well as quality of the food is of the utmost importance, and should be strictly regulated by the physician, and attended to by the mother or nurse. As a general rule the child may be allowed as much as it wants of proper food, since the appetite is almost always greatly diminished, and it is not likely, therefore, that too much will be taken. If, however, there is disposition to nausea or vomiting, or if the appetite remain as good as usual, the quantity must be restricted. The difficulty in most cases is to get the patient to take enough, and not to prevent it from taking too much, for we have very often ascertained, upon careful inquiry, that the quantity was entirely too small to support the strength of the constitution. A hearty child, six months old, fed solely on artificial food, will generally take a quart of food in the twenty-four hours, while at a year old it will take usually fully a quart or three pints of fluid nourishment, besides eating small quantities of solid food. Now, we have frequently known children laboring under chronic entero-colitis, not to take more than one or two gills of food in the day, which is manifestly that by albuminoid food Dr. Hunt refers to meat, meat-broths, eggs, and by antiscorbutic food he means tomatoes, fresh fruits, onions. Dr. Hunt says: "The value of drugs, was, perhaps, over-estimat this as in all other diseases of assimilation, and only a careful avoid of the original causes of the malady, and an equally careful recog of their continued existence in the system, could secure any de success. The scorbutic and malarial taints were almost uniformly ent, the former very frequently in as pronounced a form as the The bowels, enfeebled by the inflammatory process, were unable to form their normal function of the digestion of starches, and the therefore, became necessarily albuminoid. A full nutritious diet of minoid and antiscorbutic food assumed the first importance in the ment. Coupled with this came pure air and absolute cleanliness. with these hygienic measures alone, when they could be proper forced, it was possible to treat chronic diarrhœa and dysentery w fair degree of success, even in the great heats of a Southern sum These views confirm what we have said above, that milk, meat, ra cooked, broths, eggs, ginger-bread, tomatoes, bread and butter, and may add currant-jelly, make the best food for children over two and years of age. Even in children of eight months and a year or up of age, milk and beef or chicken tea, ought to form the chief diet. starches, such as arrowroot, barley, wheat preparations, &c., do not swer, except in very small quantities cooked in milk. We saw one c a year old, weaned in August in consequence of the illness of the nurse, whose life was apparently saved in dysentery by Liebig's extract of beef, and by its fortunately having developed a strong for the sucking of large pieces of rapidly and slightly cooked bee

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[1] The use of raw meat in the diarrhœa either of infants deprived of their mothers' milk, or of weaned children, was recommended by Weisse, of St. Petersburg, as long ago as 1840 (Oppenheim's Journal). Of late years it has been extensively used with excellent results, and is highly praised by Trousseau and other eminent authorities. The administration of the muscular tissue itself appears much more useful than any form of beef essence or soup, probably for this reason among others, that these fluids pass too quickly through the intestinal canal. The best meat for the purpose is the fillet of beef, though fine mutton may also be used. It should be cut very fine, and according to Trousseau, pounded in a mortar and strained through a sieve or cullender; the pulp, thus separated from the cellular texture of the meat, may be rolled into small balls in salt or powdered sugar.

The quantity upon the first day should not exceed three drachms, given in divided doses; but it may be doubled on the successive days, until young children may take from six to ten ounces a day. Under this regimen the diarrhœa frequently ceases, and the children quickly recover their plumpness and natural spirits.

Trousseau calls attention to the fact that the stools are frequently red and fetid at first, even when the nature and abundance of the diarrhœa have already undergone a favorable change.

In a second article upon this subject (Jour. für Kinderkrankheiten, January and February, 1858), Weisse calls attention to the fact that in many children who had been treated by raw beef, tape-worms have been developed. As these worms were all specimens of tænia solium, which is not indigenous in St. Petersburg, it is probable, as suggested by Von Siebold, that they had been conveyed in the undeveloped state in the flesh of oxen, brought from distant points. We are not aware that this unfortunate consequence has been observed frequently in other localities, and certainly in the quite numerous cases in which we have ourselves administered raw meat to children, no entozoa have been developed.

The *therapeutical treatment* of the chronic form consists princip the administration of tonics, astringents, and absorbents. Of these most important are the powdered chalk and crab's-eyes, and the diff vegetable astringents, which have already been noticed in the remark the acute form. These are to be given in the manner th slightest inconvenience to result from the use of this article in chronic mucous inflammation of the bowels, when administered in a mucilaginous solution and in very small doses." It has been much used of late years in France. MM. Trousseau and Pidoux recommend its internal use in the chronic diarrhœas of children occurring during dentition, after bismuth, powdered crab's-eyes, and diet have failed to effect a cure. Their formula is as follows:

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| ℞.—Argent. Nitrat., | gr. ⅕. |
| Aquæ Destillat., | fʒvj. |
| Syrup. Sarsap., | fʒijss.—M. |

To be given in eight or ten doses.

At the same time they employ an enema composed of a grain of the nitrate in three ounces of distilled water. It is highly recommended also in these cases by Hirsch, of Königsberg. His formula is as follows:

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|---|---|
| ℞.—Argent. Nitrat. Crystall., | gr. ¼. |
| Aquæ Destillat., | fʒij. |
| Acaciæ Pulv., | ℈ij. |
| Sacch. Alb., | ʒij.—M. |

A teaspoonful of this mixture to be given every two hours, and an enema, consisting of a quarter of a grain of the salt, with mucilage and a little opium, to be administered (*Ranking's Abst.*, No. vi, p. 61). We have employed this remedy in the proportion of from half a grain to a grain in a gill of water, by injection, morning and evening, for several days, with very decided benefit, in three cases of diarrhœa following summer-complaint, in which the stools were frequent, mucous, sometimes streaked with blood, and accompanied by tenesmus.

Dr. Woodward (*op. cit.*, p. 264) says, in his article on the treatment of the chronic diarrhœa, which was a true entero-colitis, that "by far the most valuable local measure is the employment of solutions of the mineral astringents as enemata." He mentions sulphate of copper, nitrate of silver, sulphate of zinc, and acetate of lead, but thinks that the sulphate of copper and nitrate of silver are probably the most efficient. The strength he recommends is of one or two grains to the ounce of water, of which from one to six ounces may be thrown into the rectum two or three times a day. He advises that, when the rectum rejects the injection immediately, twenty to forty drops of laudanum be added to each enema, that the injection be thrown carefully into the bowel, and the nozzle of the syringe be withdrawn as gently as possible, in order that the fluid may be retained at least for some little time. We quote these statements, not to induce the use, in children, of solutions of one or two grains to the ounce, but to draw attention to one of the means the ability and advantage of which bore the test of the vast army experience in this most severe and troublesome disease. In children it is best to begin with a grain to four ounces, and, if this gives no pain, or but little, and does not produce the hoped for benefit, the proportion may be doubled, or, after two or three trials, brought up to that of a grain to an ounce.

Another excellent remedy in the chronic diarrhœas of children, from which we have sometimes obtained very satisfactory effects, is syrup of the *nitrate of iron*. It is given in doses of from two to drops three times a day, in sweetened water, at the age of one or years.

The following formula is recommended by Dr. Eustace Smith. We have used it ourselves in several chronic cases, and have been pleased with its effects:

℞.—Liq. Ferri Pernitrat., . . . . . f ʒss.
Acid. Nitric. Dil., . . . . . . f ʒss.
Syrup. Zinzib., . . . . . . f ℥j.
Aq. Anethæ, . . . . . . ad f ℥iij.—M.
A teaspoonful every six hours at one year of age.

We have found a teaspoonful every three or four hours not too at three and four years of age.

*Creasote* also has been recommended of late years, and is highly of by some practitioners. It may be given in doses of from a quart half a drop every three or four hours at a year old. Bouchut recomm enemata of from ten to twelve grains of extract of *rhatany*, or six of *tannin*, in about five to seven ounces of some vehicle.

Dr. Pollak, of St. Louis (*Trans. Amer. Med. Assoc.*, vol. viii, p. speaks in the highest terms of the efficacy of sulphuric acid in diar He thinks that he has succeeded in establishing, beyond cavil or "the almost specific effect of sulphuric acid in all cases of diarrhœa say in all cases of diarrhœa, and in diarrhœa only, for I hold it is reliable, and even frequently injurious, in dysentery." He says, speak ing of adults, that "the majority of cases were cured in 24 or 48 few required the use of it for four days, and only a very small took it as long as eight days; they got nothing else, and were cured He also states he "could successfully prove, that in the much and dreaded summer-complaint of children, in cholera infantum, it is preferable to the mercurial, chalk, astringent, and opium treatment even more rapid and more positive in its effects with children than adults."

The dose he gives to adults is usually half a drachm of the arom sulphuric acid every four hours, and he remarks that from four to doses generally sufficed to effect a cure. His usual formula (for adu is as follows:

℞.—Acid. Sulph. Arom., . . . . . f℥ss.
Tinct. Cardamomi Comp. (or Sp. Lavandulæ Comp.), Syrupi Simp., āā, . f℥j.—M.

The dose is printed two *tablespoonfuls* every two hours, but this must an error of the printer; two *teaspoonfuls* must be the dose intended. there be tormina, feeble pulse, general prostration, I added aq. campho f℥j, and gave it in shorter intervals." Dr. Pollak adds, that "the dose is almost invariably ejected, probably from its suddenly astringing the stomach. I then ordered iced water to drink *ad libitum*, in order to soothe and distend mechanically the stomach; had the dose repeated immediately, and have never seen it returned afterwards." Dr. Pollak does not inform us of the doses he employs in the case of children. We may suppose, however, that for a child of two or three years old, half a teaspoonful of the above mixture, and for a younger child a yet smaller quantity, would be quite enough.

We have never used sulphuric acid in such large doses as the above, but for some years past have been in the habit of employing it in the following mixture with excellent results. In cases of diarrhœa showing a disposition towards dysentery, as often occurs in entero-colitis, and especially when the stomach has been irritable, so as to bear other medicinal substances badly, we have found this combination very beneficial.

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| ℞.—Acid. Sulph. Arom., . . . . | gtt. xlviij. |
| Tinct. Opii, . . . . . . . | gtt. xij, vel xxiv. |
| Syrup. Krameriæ, . . . . | f℥ss. |
| Aq. Fluvial, . . . . . . . | f℥ijss.—M. |

A teaspoonful every two hours.

It should never be forgotten in the treatment of chronic diarrhœa in children, that the most important point of all is the regulation of the diet and other hygienic conditions. We are fully convinced that we have seen several children saved from death by attention to these points, and by the persevering and careful employment of tonics and stimulants. It often happens, after the disease has lasted for some weeks or months, that the powers of the stomach are almost wholly lost. The child either refuses food or takes so little that the quantity is evidently insufficient to carry on the vital processes, or the greater part of what is taken is rejected by vomiting, or lastly, much of it passes off through the bowels, and appears in the stools in an undigested state, forming what is called lientery. If this condition of things is allowed to continue, the emaciation and exhaustion make rapid progress, and the case must soon terminate fatally. Under these circumstances all the ingenuity and skill of the physician are required to find articles of diet of a kind to recall and tempt the child's worn-out and often perverted appetite, and which, at the same time, may be digestible and nutritious, and tend to restore vigor to the digestive function. If the stomach is frequently sick, it is best to abandon all remedies but those which are stimulating and strengthening, and especially to forbid all such as are in the smallest degree nauseous. We would indeed depend entirely on the use of repeated doses of the oldest and most delicate brandy that could be found, of which from one to two teaspoonfuls may be put into a wineglassful of cold water, and the whole given by teaspoonfuls in the twenty-four hours; or fifteen to twenty drop doses of the elixir of Peruvian bark every three or four hours may be used; or Hawley's wine of pepsine, in half teaspoonful doses three times a day; or, two or three drops of tincture of nux vomica in sweetened water three times a day, if the bitterness does not cause nausea or increase the loathing. In such cases, wine of iron, in doses of [illegible] drops to a fourth of a drachm, with syrup of tolu and caraway [illegible] sometimes do exceedingly well; or the following, which has [illegible] succeeded in our hands:

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| ℞.—Tr. Ferri Chlorid., . . . . . . | fʒj. |
| Acid Acet. Dil., . . . . . . | fʒj. |
| Liq. Ammon. Acetat., . . . . . | fʒij. |
| Syrup. Simp., . . . . . . . | f℥ss. |
| Aquæ, . . . . . . . . | f℥ij.—M. |

Dose at four years, a teaspoonful, and under that age, half a teaspoonful [illegible] four times a day.

In some very obstinate cases, especially where there is any [illegible] suspect the existence of a malarial element in the case, from half a [illegible] to one minim of Fowler's solution of arsenic, with the wine of [illegible] times a day, has been very serviceable. While this is being [illegible] occasional dose of anodyne, just enough to tranquillize without [illegible] ing, may be given. If the rectum will retain it, it is better to give [illegible] enema. In some cases we have found the aromatic syrup of [illegible] with brandy, to be taken by the child without any difficulty or [illegible]

Exercise by riding and exposure to the air, which, however, must [illegible] be carried so far as to induce positive fatigue, are all-important. [illegible] very severe and tedious cases, change of residence or travelling [illegible] known to effect a cure after all remedies and other means had failed. [illegible] one case, in this city, which had lasted with but short intervals [illegible] years, we obtained a perfect cure by persuading the parents to [illegible] child into an elevated part of the country in the month of May, [illegible] was kept until July, after which it was removed to the seaside until [illegible] end of August. Nothing was done in the meantime except to [illegible] the diet most carefully, and to keep the child the greater part of [illegible] in the open air.

## ARTICLE III.

### CHOLERA INFANTUM.

General Remarks.—In the previous editions of this work we [illegible] to draw with sufficient clearness the distinction between what we [illegible] ought to be called cholera infantum, and the much more common [illegible] orders which are properly styled simple and inflammatory [illegible] entero-colitis. In this we did but follow the practice of most [illegible] writers, and the custom of the day. Indeed, many physicians [illegible] us are still in the habit of designating the various intestinal [illegible] children so frequent during the summer heats, under the common [illegible] of cholera infantum. We believe that a large majority of the [illegible] registered in our mortality returns under the title of cholera [illegible] the result not of a true choleraic disease, but rather of simple diar- œa or entero-colitis. We have, however, only too often to contend th a disease in children which deserves the title of cholera, which is the alogue of cholera morbus, or even of epidemic Asiatic cholera, in the ult, and which is the disease we propose to consider in the present apter.

DEFINITION; SYNONYMES; FREQUENCY.—We can define cholera infan- m only by an enumeration of its most specific characters, and we shall this very much in the words in which Dr. Aitken describes epidemic olera. Cholera infantum, as we understand it, is characterized by the currence almost solely during the summer months, in young and gene- lly teething children, who have been previously either healthy or the bjects, for a longer or shorter time, of simple or inflammatory diar- œa, of sudden muscular debility, occasional nausea, spasmodic griping ins in the bowels, depression of the functions of respiration, and an pearance of faintness; copious purging of thin serous fluid, or of large tery and fetid evacuations, succeeded by more or less obstinate vomit- g, coldness and dampness of a part or of the whole surface of the body, ldness and lividity of the lips and tongue, cold breath, a craving thirst, feeble rapid pulse, difficult and oppressed respiration, with extreme stlessness, diminished or suppressed urinary secretion, pallor of the tire surface of the body, a sunken and pinched countenance, weak- ss of the cry or partial aphonia, and collapse, more or less complete, ich may prove fatal, or be followed by reaction and a subsequent more less severe and obstinate simple or inflammatory diarrhœa.

This disease is not so common as simple and inflammatory diarrhœa, ost cases of which have been hitherto, as stated above, improperly ouped under the common name of summer complaint. Though rare in urope, in comparison with its frequency in this country, it is easy to cognize from the descriptions, the identity of some of the cases called y Billard follicular enteritis, by Barrier apyretic and febrile follicular acrisis; by Rilliet and Barthez, in their second edition, choleriform stro-intestinal catarrh, and by Copland, the choleric fever of infants, ith the true cholera infantum of America.

It is impossible to determine its real frequency amongst us, for the rea- n that fatal cases of simple diarrhœa and entero-colitis, are so generally cluded in our mortality returns, with those of the true choleraic disease, der the common title of cholera infantum, or summer complaint. That is a frequent cause of death is shown, however, by the tables of Dr. merson (*Am. Jour. Med. Sciences*, vol. i, 1827), wherein it appears that om 1807 to 1827, 3576 deaths from cholera, under five years of age, ere returned in this city; of course many of these deaths were from a ue choleraic disease. This is the largest number of deaths from any ne disease given in the table. The next largest item of mortality is nder the head of convulsions, of which it appears that 3192 died in e same period of time. During the five years, from 1844 to 1848 in- usive, there occurred in this city, 18,599 deaths, from all causes, under teen years of age. Of this total, 1611 died of the so-called cholera in-

and dysentery, with the total mortality at all ages, and with the temperature of each month.

CAUSES.—In discussing the causes of cholera in children, we meet the difficulty so often alluded to, viz., the custom in this country of ing in mortality returns, all the deaths from intestinal affections in hood, under the common title of cholera infantum or summer comp Our own experience leads us to the conviction that the causes are same as those of simple and inflammatory diarrhœa, acting with gre intensity. When that cause, or those causes, whatever they may be with moderate force, the result will probably be a simple or inflamm diarrhœa. When, on the contrary, the causes are intensified in the case will be apt to take the form of choleraic disorder. Thus is one of the most influential of these causes. So long as the pheric temperature is moderate, the resulting disorders will pr take the form of simple or inflammatory diarrhœa. But let the temp ture rise to 85° or 95° Fahr., or even higher, as happens occasion our summers, and continue at that height for three or four days children previously well, will be seized with the true choleraic form diarrhœa, whilst those who are already suffering with simple or matory diarrhœa, are prone to have these milder diseases assume denly the choleraic type.

A glance at the table above referred to, shows most plainly the of heat upon the mortality from bowel diseases in children, under years of age. It will there be seen that, in the two months of July August, when the mean monthly temperature is between 75° and the mortality from cholera infantum rises to between two and four hun and even over; whilst during the cool months, as January, February, vember, and December, when the mean monthly temperature is betw 30° and 40° generally, only one, two, three, or none at all. are repor ot weather. Sudden weaning, a change in the character of the artificial ood, the unfortunate use by accident, or by the carelessness of the nurse, f unwholesome milk, of improper vegetables, or, as not unfrequently appens, of green or unripe or unhealthy fruit, as apples, currants, goose-erries or blackberries (instances of all of which we have ourselves met ith), will sometimes bring on in a very few hours, the most violent at-acks of cholera, or convert a previously mild and comparatively safe iarrhœa into the more violent form of disease we are considering. These esults are especially apt to follow such accidents or imprudences in large ities, where the hygienic conditions are always in summer of a kind to nvite the more violent and dangerous forms of intestinal disorder. In ine, the conditions which have been ascertained to be most certain to roduce epidemic cholera, when that disease is present in a locality, are hose which develop cholera in children. To put before the reader the onditions most certain to cause cholera in children, we cannot do better han to quote from the *Report on Epidemic Cholera to the Citizens' As-ociation of New York in* 1865, the *localizing* causes of cholera.

These are:

1. Decaying organic matters, bone, hide, fat and offal houses, neglected tables, putrescent mud, and filth.
2. Bad drainage, local dampness, malaria.
3. Obstructed sewers, filthy streets, gutters, stables, garbage, and cess-ools.
4. Water and beverages in any manner contaminated by putrescent rganic matter, particularly by any soakage from privies.
5. Neglected privies and putrefying excrement.
6. Overcrowding and neglect of ventilation.

It is just where these conditions are most rife that choleraic diseases in hildren are most apt to occur. Amongst the poor, who inhabit the crowded uarters of cities, where the streets and alleys are small and narrow, where eaps of decaying vegetable and organic matters abound, where water is cant or scantily used, where ventilation, from the manner in which the treets are laid out, and from the crowding together of buildings, is nec-ssarily imperfect, we have the most numerous and the severest forms of he disease. Add to these the small size of the houses, the low ceilings, he small and few windows, and the interior arrangement of the rooms, hich is such that a thorough draught is unattainable, and we need not onder at the prevalence of the disease. It is amongst the poor, too, that he food is often of necessity, as well as from ignorance and recklessness, f the most improper kind, and not unfrequently, insufficient in quantity.

But not only the poor, in their unhappy lot, suffer from this disease. he children of the rich, with all the advantages of the most wholesome ygienic appurtenances which ease and knowledge can supply, are apt to ontract it if they remain in town during the hot summer months. So well s this known that most families in easy circumstances leave the city for he seaside or the interior, so long as their children are young, remaining bsent usually from the middle of June to the middle or end of September.

cause of the disease, and yet it would seem to be less influential th for the tables of Dr. Emerson show that it is about twice as fata first year as in the second, though the process of dentition is ev more active and continuous in the second than in the first year. W rarely observed it before the beginning of the process of dentition, is certainly very rare after its completion.

*Age*, as has just been stated, exerts a strong influence in the prod of the disease. In the tables of Dr. Emerson, the cases of chole fantum and cholera morbus are included under the one head of ch but as all cases of the disease under five years of age are called c infantum, the want of the distinction does not make the statemen useful to us. From them it appears that there were 2122 deaths first year, 1186 in the second, and only 268 between the second an Between five and ten years, only 52 cases are noted, and these w course be entitled cholera morbus. In the five years, from 1844 t inclusive, of 1611 deaths from cholera infantum under 15 years o 969 occurred in the first year of life, 529 in the second, 103 betwe and five years, and only 10 after that age.

*Sex.*—There are no large tables of reference, by which to ascert exact proportion in which the disease occurs in the opposite sex would appear, however, from our own experience, to be much mor mon in males than females, since of 77 cases of which we have k record, 48 occurred in boys, and only 29 in girls.

*Constitution.*—The disease is most apt to occur in feeble, delicate dren, and in those of nervous, irritable temperament.

*Hereditary Predisposition.*—Our own observation leads us to b that the disease is apt to occur in certain families. It would seem p able that this peculiarity must depend on the fact that the constit of some families are particularly disposed to disorders of the dige same way. The mother of these children was herself very ill with the disease on several occasions during her infancy, as was also her brother.

Anatomical Lesions and Pathology.—It will be readily understood that it is far from an easy task to define precisely what are the essential lesions in true cholera infantum, as we have described it. Having been confounded so long with ordinary inflammatory diarrhœa, the lesions usually attributed to it are precisely those we have detailed in our article on the latter affection. In those cases again where the true choleraic disease appears during the course of inflammatory diarrhœa, it is of course difficult to determine to which affection the lesions presented after death are in reality due. We must, therefore, seek for the true and proper lesions of cholera infantum in the comparatively rare cases in which this affection has appeared in the midst of good health, and has proved fatal during the acute stage. With this restriction then, it appears that the only anatomical changes which can be regarded as constant and essential to the disease, are enlargement of the mucous follicles, and to a less degree, of the glands of Peyer; and softening, and in some cases erythematous inflammation of the mucous membrane.

There can be little doubt that the appearances thus indicated, depend upon the presence of an early stage of inflammation of the tissues of the intestinal walls, and of the mucous follicles. This view is supported by the similarity between these lesions and those found in cases of entero-colitis, proving fatal during the early stage, as well as by the fact that where the child survives the choleraic stage, and ultimately dies after a continuance of diarrhœa for some days, or even several weeks, the lesions are found to have developed into those ordinarily found in primary entero-colitis.

It is, however, necessary to consider briefly what additional element is present, in this form of disease, which impresses upon it such peculiar and fatal features; or, in other words, what is the pathology of the collapse which characterizes cholera infantum.

It is a matter of much regret, that as yet we are wanting in careful microscopical examinations of the condition of the epithelium of the mucous membrane, and of the characters of the evacuations. We should anticipate, however, from the evident similarity between cholera infantum and sporadic cholera, or cholera morbus in the adult, that in the former as in the latter disease, such examination would reveal rapid proliferation and exfoliation of the cells of the mucous membrane.

In regard to the explanation of these lesions, we would refer the reader to the remarks upon the pathology of entero-colitis, where we have expressed our belief that the causes of these affections (heat, noxious emanations, unwholesome food), act in a complicated manner, by inducing a state of malnutrition in which the tissues are prone to undergo inflammatory changes, by loading the blood with noxious substances, which may irritate the glands which excrete them, and finally by interfering with digestion, so that the contents of the intestinal canal undergo changes which render them highly irritating.

Sedgwick, in a highly valuable article, "*On some Analogies*
*in which suppression of urine is not accompanied by symptoms*
*poisoning*" (*Med. Chir. Trans.*, vol. li, p. 1, 1868), in which he
lected many such examples. Among the causes which are clea
lished as capable of producing such an analogous condition, are p
doses of corrosive sublimate, arsenic, some of the mineral acids, e
nitric acid; and also of certain drastic purgatives, especially c
In these cases the peculiar symptoms produced, which are
described by accurate observers as most closely analogous to
cholera collapse, are due exclusively to the direct irritant acti
substance upon the gastro-intestinal mucous membrane.

The same effects have frequently been observed to follow the
drinking of poisonous animal matters, such as tainted or simply
some meat or fish, and milk which has undergone some injurio
yet unknown change, decomposing vegetables, and some of the p
fungi. In this last group of cases, the local irritant action of t
stances swallowed, must certainly be regarded as the principal
the production of the symptoms, although it is quite possible
ingestion of such putrid animal or vegetable substances should al
an altered condition of the blood.

In like manner, there are numerous morbid conditions of the in
or their peritoneal covering (as perforation with subsequent pe
peritonitis from extension of inflammation, intestinal obstructio
may be attended with symptoms closely analogous to those of
collapse.

We will also quote from Rilliet and Barthez, the following pa
regard to the remarkable memoirs upon *Inanition*, by Dr. Chossa
neva, which show the analogy which exists between the results of
mental inanition and the chief symptoms of cholera infantum.
is seen especially (1.) In the diminution of temperature, which co
with the loss of weight, is in inanition, as in cholera infantum, one

is, however, evident, that the mere drain of fluid from the alimen-
canal, although it undoubtedly has much influence upon the course of
isease, cannot be regarded as the efficient cause of collapse, since
any cases profound collapse occurs with comparatively scanty dis-
ges.

too we must regard Dr. Johnson's hypothesis (*Medico-Chir. Trans.*,
i, 1867, p. 103, *et seq.*), that the symptoms of collapse are due to a
n of the minute branches of the pulmonary artery, caused by the
fic alteration of the blood in cholera, as based upon insufficient ar-
nts. Thus, in the first place, we have cited instances above where
toms altogether similar to those of cholera collapse, are produced
r circumstances in which it is impossible even to suspect the exist-
of a poisoned state of the blood. Again, there is neither any clini-
r anatomical evidence to show that the contraction of the pulmonary
y is relatively greater than that of the rest of the arterial system;
ain, that such contraction precedes the other signs of collapse.

the last edition of this work, we quoted the opinion of Rilliet and
nez in regard to the implication of the sympathetic nervous system
olera infantum, and since that time we have been led to regard this
and more strongly as the essential cause of the collapse which char-
izes this and other choleraic conditions.

e passage extracted from the admirable work of Rilliet and Barthez,
s follows: "The disease we have just described is, in our opinion,
arrh which has localized itself upon the digestive tube and the great
athetic nerve. It is, of all forms of the catarrhal affection, that
h most clearly justifies the idea of a poisoning. It proves also that
omical differences alone will not suffice to establish a separation be-
n the various species of the disease.

ts catarrhal nature is demonstrated by the causes, which are those
l catarrhs (improper alimentation, epidemic influence, &c.); by the
gy of the symptoms; by the gradual passage of the mild into the
e forms, through intermediate cases; and lastly, by the fact that
le intestinal catarrh is often but the prodrome of choleriform enter-

Reasoning from the simple fact that the disease is catarrhal, we ad-
the existence of a modification of the whole economy, and of some
ation of the blood.

study of the anatomico-pathological descriptions of the disease, and
ially the observation of cases, demonstrates that the gastro-intes-
tube of children dying of this affection, may be found in four differ-
onditions:

. Either the stomach is softened without any lesion of the digestive

. Or the stomach is softened, at the same time that the mucous mem-
of the intestines and especially its follicular apparatus, is diseased.

. Or the stomach is healthy, whilst the follicular apparatus or the
us membrane are diseased.

. Or, lastly, the gastro-intestinal tube fails to exhibit any lesions appreciable by our senses in the present state of our knowledge, presents alterations too insignificant to explain the gravity of the symptoms."

. . . . "Up to this point the disease resembles all other catarrhs; what gives to it a special type, is the abundance of the serous secretion, and the disturbance of the great sympathetic nerve.

"The serous secretion, which seems to be produced by pers- (analogous to that of the respiratory passages and of the skin), not by a follicular secretion, shows, perhaps, that the elimination of matter is accomplished by other organs than the follicles; and perhaps, to see in this a proof that the matters to be eliminated the same as in simple catarrh. On all these points we are compelled remain in doubt; we content ourselves with stating the fact.

"The functional derangements of the trisplanchnic nerve play portant part in the disease; under this point of view it differs mild form, in which the innervation is normal, and from the cerebral in which it is especially the cerebro-spinal apparatus that is symp- cally affected. The proof of a disturbance of the ganglionic nervous tem, rests upon the following physiological and nosological con- tions:

"The disease exists at the age and in the physiological condition tition), in which functional derangement of the nervous system lesions of organs, are most frequent; it is often complicated with very disorders of the general innervation, as is proved by cert found changes in the functions of nutrition, circulation, and calor which the amount of material waste will not always account for. casionally observe the same symptoms of nervous sideration, and larly the extreme smallness of the pulse, and the algid phen arise in certain of the most violent attacks of spontaneous pa Now these phenomena which cannot always be referred to the of the pain, and which do not exist in inflammations of the oth membranes, no matter what the rapidity of their course, are explained by the fact that the disease, seated in the abdomen, the ganglia of the great sympathetic nerve."

Since the date at which this was written, our knowledge of tions of the sympathetic nerve, especially with regard to its regulating the calibre of the arteries, by inducing contraction or relaxation of their muscular coat, has been much advanced: and fully prepared to understand how the symptoms of cholera collapse be explained upon the supposition of a wide-spread powerful irr the fibres of the sympathetic nerve, so richly distributed to the the alimentary canal, and which have such intimate relations with nervous supply of the whole arterial system, the heart and lungs.

Thus we can most readily explain in this way, the small, thready the cold, pale, and shrunken skin; the asphyxia and coldness breath; the diminution in the formation of urea and in the secr urine.

The above views of the pathology of choleraic collapse, have ate ably supported by Sedgwick (*loc. cit.*), and Dr. Horace Jeaffreson *Edin. Med. Jour.*, December, 1866, p. 520).

At the same time, the probability is that the vaso-motor nerves of the ntestinal walls themselves are paralyzed, from exhaustion of their excitaility, so that dilatation of the vessels occurs with profuse discharge of erum.

So far as experimental research can be made available in deciding quesions involving such deep-seated and delicate parts, the results entirely onfirm the explanation given above. Thus both Moreau[1] and Asp,[2] have ound that, after section of the branches of the sympathetic nerve supplyng the intestines, a copious secretion of alkaline serous fluid takes place nto the bowel.

SYMPTOMS.—Restricting, as we now do, the term cholera infantum to ases which have a truly choleraic character, we shall have a smaller round to go over than we had in our previous editions.

The *invasion* of the choleraic symptoms is sudden. The child may ave been quite well previously, or may have been the subject for an inefinite length of time—days or weeks—of simple or inflammatory diarhœa, when, from exposure to high summer heats (85° to 95° Fahr.) in city, or more rarely, in the country; from being allowed to take some nwholesome article of food; from the effort of cutting teeth; or perhaps rom having been chilled by night air, or by a sudden change of the eather from hot to cool; the choleraic disorder breaks out, with almost imultaneous vomiting and purging. The diarrhœa is, from the beginng, violent. The stools are usually frequent, consisting almost entirely f a thin fluid, which runs through the napkins and wets the clothes of he child. Sometimes the discharges are not very frequent, but each one nay be so large as to wet not only the napkins and clothes of the child, ut to run through to the lap or bed on which the patient lies. The chief nd important characters of the stools in true cholera infantum, as in holera of the adult, are their fluidity and quantity. These two characers, more than the vomiting or the nature of the discharges in any other espect, are the special signs of the disease, and by the degree in which hey are present do we recognize the disease, and usually determine its everity. The fluid thus rendered by stool may be of different characers. It may be an almost colorless liquid, merely wetting the napkins nd clothing, as though they had been dipped into a bucket of water, or aturated with the pale urine of a healthy infant; or they may consist of he same watery fluid, holding in suspension small and soft flocculi of ecal matter of a yellowish or greenish color, or small, detached portions f mucus, which are left upon the napkins as the watery fluid drains rough them. When the stools are of this kind, they are usually almost odorous. In other cases, they are still very watery, but the fluid is yellowish or brownish in color, contains rather a larger amount of the feculent matter, and has a most offensive odor,—an odor which is peculiar for its extreme fetidity, a fetidity so great that we have known it to cause vomiting in those exposed to it, and so adhesive as to render it necessary to change at once all the clothing and bed-linen of the child, and even then the fetor may cling to the body of the patient after repeated washings. This odor we have seldom met with except in the choleraic form of summer diarrhœa. The number of the stools vary greatly. We have known as many as twelve to be passed in as many hours. In other cases they are not so frequent, but the quantity at each time may be so great as to drain the body of its fluids at a more rapid rate than many more evacuations of an ordinary size. Eight, twelve, fifteen, or more than twenty stools in twenty-four hours are not rare. In one fatal case, in a child between one and two years old, there were between twenty-five and thirty stools during the second night of the attack, in a space of twelve hours.

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[1] Comp. Rend. de l'Acad. des Sciences, t. lxvi, p. 554, 1868, in Medical Times and az., April 11th, 1868, p. 397.

[2] Beobacht. ü. Gefässnerven, Ludwig's Arbeiten, 1868, p. 181, Abst. in Jour. of at. and Phys., November, 1868, p. 211.

Simultaneously with, or soon after the diarrhœa sets in, there is vomiting. The matters vomited consist at first of the ordinary contents of the stomach, food, and water. Soon these matters consist of the water, the medicines that may be taken, and of a serous or sero-mucous fluid mixed with small portions of bilious matter. Sometimes they are grass-green as so often happens in the gastro-intestinal affections of children. The vomiting may or may not be very frequent. Sometimes it is one of the severest elements of the disease, causing everything taken to be rejected almost as soon as swallowed, or assuming the form of repeated and exhausting retching even when the stomach is quite empty. In connection with these symptoms there is rapid loss of strength. The child is restless and still between the evacuations and vomiting, or tosses and moans with the jactitation of severe illness. The appetite is lost, but thirst is extreme, and constitutes one of the marked phenomena of the disease. Water and ice are seized upon with the greatest avidity, and taken almost incessantly, if allowed, though rejected only a few moments afterwards.

The abdomen is flaccid or retracted, not tender to the touch usually, and the walls inelastic, so that they can be readily pinched up into folds. The tongue, moist at first, with a thin white fur upon it, becomes pasty or dryish after a time, and is sometimes protruded from time to time between the lips.

The pulse runs up from the first, rising soon to 130, 140, and 150, and being usually small in volume, whilst the temperature remains for a time normal, rises slightly above the natural point, or, in some few cases the skin becomes hot. The urine diminishes in all these cases, and in very severe ones, ceases to flow, or flows only in the smallest quantities. As in true cholera, the degree of suppression of this function is in proportion to the severity of the choleraic discharges. The respiration, natural at first, soon becomes, if the case goes on unfavorably, irregular, unequal, and anxious. The temper is irritable at the beginning, the child is restless, peevish, disposed to fret and cry at the least contradiction;

disturbance. The sleep is restless and disturbed, especially at night. The child wakes frequently, and almost always with crying. When asleep, the eyes are often but half closed, and the brow contracted and frowning. The countenance soon becomes anxious and distressed. In sudden and severe attacks, it is languid and subdued, pale and contracted.

If the disease is not soon checked, signs of collapse make their appearance, and become more and more marked features. The body becomes cool and then cold, the pulse grows smaller, thready, and very rapid; the features are drawn; the nose is sharp and thin; the eyes shrink within the orbits; the cheeks become sunken; the patient passes into a still, quiet, and drowsy state; the vomiting may cease, but the diarrhœa usually persists; the child falls into a comatose or semi-comatose state, and death occurs quietly in this condition, or may be preceded by slight convulsive movements. Some very violent cases run their course in a day, a day and a half, or two or three days. We, ourselves, do not recollect to have seen any case terminate sooner than in three days and a half.

In favorable cases, after one, two, or three days, the diarrhœa ceases to be so violent; the stools grow less frequent, smaller in quantity, thicker in consistence, containing a better concocted fecal matter, and regaining a more natural odor. The vomiting and thirst gradually subside; food is again taken and retained; the circulation falls, and the child, though weak and thin, and the subject for some days of a simple diarrhœa, may regain its health in great measure, at the end of a week or ten days. More frequently, however, the disease assumes the form of a more obstinate simple or inflammatory diarrhœa, which may last for several weeks, to take on again, perhaps, from a recurrence of the exciting causes, the choleraic form, or to persist in one of the former shapes until the return of cool weather.

Such is a picture of the disorder to which we think the name of cholera infantum ought to be restricted. If physicians could agree to limit the title to this true choleraic disease, our mortality returns would soon show the comparative frequency of death from this disorder, and from those more tedious and chronic diseases which have already been treated of under the designation of simple and inflammatory diarrhœa or enterocolitis.

The *duration* of cholera infantum, as we restrict the term, is seldom more than two, three, or four days. It may prove fatal in a much shorter time. Dr. Eberle (*Dis. of Children*, p. 285) says it sometimes runs on to a fatal termination in five or six hours. Dr. J. Lewis Smith (*op. cit.*, p. 392) reports a case in a child sixteen months old, which ended fatally in less than one day; a second, at seven months, after a sickness of about one day; and a third, at twenty months, in thirty-six hours. We do not recollect, in our own experience, which has been chiefly in private practice, a shorter case than one of three days and a half. In favorable cases the diarrhœa usually persists, as already stated, for several days after the disappearance of the choleraic phenomena, and very frequently runs on into a simple or inflammatory diarrhœa, which follows the law of those disorders.

a disorder which is readily recognized after being once seen, or may be distinguished by any intelligent person who has never yet met such a case, if only the progression of the symptoms be carefully inquired into, and correlated with the present condition.

**Prognosis.**—Cholera infantum, as we restrict the use of the term, is, of course, always a dangerous disease. Collapse, which either threatens all who are attacked by it, or actually supervenes to a greater or less degree, is well known by all physicians to be one of the most formidable morbid conditions to which the body is liable. The degree of danger in any individual case must depend chiefly upon the ability of the physician to arrest, and of the patient to resist, this state. The probability of the supervention of collapse depends very much upon the hygienic conditions in which the child is placed, upon the age of the patient, the state of the process of dentition, the present state of health, the innate vigor of constitutional force, and also, we may say, upon the period of the disease and the degree of wisdom with which medical means are applied. Children placed in favorable hygienic conditions in the country, or in the healthier parts of cities, in large and well-ventilated rooms, and who have been fed upon proper diet, and who have therefore been attacked by the disease whilst in previous fair health, are much more apt to escape collapse, or to recover from it, after it has made its appearance in a more or less marked degree, than those who are placed in conditions the opposite of those we have enumerated. Early age, recent weaning, improper artificial diet, and feeble vital powers from any cause, either inherited or acquired, are amongst the most unfavorable prognostics. Still, we should never despair until the last moment, since we have seen some most surprising recoveries from apparently desperate conditions in this disease.

The prognosis may be stated in general terms to be unfavorable in proportion to the frequency and violence of the vomiting, the number drowsiness or stupor, and then coma, convulsions, rigidity, or paralysis make their appearance, there is scarcely a hope left.

The favorable symptoms in any case are, diminution of the fever; equal temperature of the whole surface; cessation of vomiting; decrease in the number of the stools, and a return to their natural color, consistence, and odor; quiet, tranquil sleep; return of appetite; and lastly, a restoration of the natural temper and gayety of the child.

TREATMENT.—*Prophylactic Treatment.*—The danger to which teething children are exposed from residence in this city during the hot months of the year, is now so well understood that most families who can afford it remove to the country during the warm season, and by this course very generally avoid the disease. It is undoubtedly the best plan that can be adopted, and very commonly succeeds. When this cannot be done, however, the prophylactic treatment consists in a most careful attention to diet, dress, and exposure to the open air. If possible, the child should be kept at the breast until it has passed through its second summer, as there is but little danger from the disease after that period. If the weaning must take place prior to that age, it ought to be accomplished before the hot weather begins, as a change from the breast to artificial food during the warm season is very apt to bring on the disease. If the child is weaned, the diet must be strictly attended to. Up to the age of ten months or a year, the food should consist almost wholly of milk containing arrowroot, rice, oatmeal, or some farinaceous substance in small quantity. A little plain chicken or mutton water, with rice boiled in it, or a piece of beef or chicken to suck, may be given occasionally, but all vegetables and fruits should be strictly forbidden. After the age of ten months, some light soup and small portions of mutton, chicken, or very tender beef, minced very fine, may be given every day in addition to the milk food, which must still form the major part of the child's nutriment. Fruit of all kinds, all vegetables except rice and potatoes, and the latter are doubtful, ought to be carefully avoided until after the hot season has passed entirely away, or until the child has its full set of teeth. We have found the food prepared with gelatine, in the manner described at page 304, to answer better than anything else for a large number of children to whom we have prescribed it.

The dress ought to be arranged according to the heat of the day. It is the fashion in this city to keep young children clothed all summer in thick flannel jackets, and petticoats, and woollen socks. This is certainly too much for the hot days which so frequently occur in July, August, and early in September, and is often, we believe, very injurious. A light gauze flannel shirt is the only woollen garment that need be worn during the warm season. On hot days a child should have only this, a muslin petticoat and frock, and the lightest possible socks, or none at all. If, as constantly happens in our climate, a cool day comes, there should be added to these a light flannel petticoat.

It is of the utmost importance that children should pass as large a portion of the day as possible in the open air. In the country this is easily managed, and parents almost always contrive to accomplish it; but in a

diet, dress, exposure to the air, and exercise, much may be done
preventing the disease even in families obliged to remain in the city
ing the summer.

As stated in the account of the symptoms, the choleraic disease
supervenes in children who have already been the subjects of sing
inflammatory diarrhœa. When, therefore, a child in the city
rhœa, if it do not yield readily to treatment, and especially if the
begin to be thin and watery, with any marked tendency to exhaust
ought to be regarded as being threatened with cholera. In such a
the best prophylaxis in the world is instant removal to some high
locality or the seaside.

TREATMENT.—Regarding this disease as a truly choleraic one, we
follow, in the consideration of its treatment, the plan adopted by
of the more recent writers on Asiatic cholera; and shall accordingly
our discussion of this subject into the treatment appropriate for the
stages of *evacuation*, *collapse*, and *reaction*.

Every young child who is attacked with diarrhœa, whether sing
inflammatory, in the summer season, ought to be regarded as lia
cholera, and should be carefully watched to prevent the develop
this disease. For the proper treatment of such conditions, the rea
referred to the article on those affections.

Should a child, either previously well, or the subject of diarrh
the ordinary form, be attacked with sudden, profuse, frequent, and
discharges, and especially, should these be associated with vomiting
spasmodic intestinal pain, and with any appearance of general ex
tion, it ought to be presumed to be in the early or *evacuation* st
cholera infantum, or in what is the analogue of the evacuation sta
epidemic cholera. Under these circumstances, it has been a pre
practice here to give a cathartic, castor oil, calomel, or rhubarb.
think the practice wrong, unless there be positive evidence that
attack has followed directly upon the use of some unwholesome art

and watery, we use the chalk mixture, with tincture of krameria and laudanum or paregoric (a teaspoonful of the chalk mixture with ten to fifteen drops of the krameria, and one drop of laudanum, or five of paregoric) every two hours at the age of one year. Thirty drops of the syrup of nutgalls (see article on entero-colitis), with an opiate every two hours, is often very useful. We believe that the great object is to arrest the watery discharges by stool. If the above means fail, laudanum may be given by injection, and two drops at one year, and double the dose at two years, every two or three hours, may be tried in addition to the above treatment. The quantity of opium must depend on its effects. Children, like adults, bear very different amounts. As soon as positive drowsiness appears, or the pupils become contracted much below their natural size, the doses must be suspended or diminished, or the intervals between them lengthened. Of course, if the stools lessen in frequency, quantity, or fluidity, the same reduction in the amount of the opium ought to be made.

When vomiting is severe and frequent, and the above remedies are rejected, we may use the one proposed in the article on inflammatory diarrhœa, consisting of solution of morphia, dilute sulphuric acid, and curaçoa cordial. This, or some similar remedy, is at times very successful. It is nineteen years since one of us saw a child nine months old, in deep collapse from a most violent attack of cholera infantum, who rejected its mother's milk as though it had been tartar emetic, whose stomach was only made worse by calomel, but who began to improve very soon upon doses consisting of two drops of aromatic sulphuric acid, and five drops of solution of morphia, in a teaspoonful of iced-water, every hour. Since then we have frequently used the mixture above recommended in such cases, and we think, on the whole, with more control over the vomiting than anything else we have tried.

The experience gained by careful and lengthened observation in the treatment of the evacuation stage of Asiatic cholera, may well be applied to the affection under consideration, so much alike are they. Dr. Goodeve (*loc. cit.*, p. 177) gives first a full dose of opium (he says that calomel was generally combined with it in India, and though he does not "know that the calomel does good, it does no harm"), to an adult two grains, and half an hour afterwards he begins with an astringent, in his own practice, usually the following mixture:

| | |
|---|---|
| ℞.—Plumbi Acetat., . . . . . . . | gr. xxx. |
| Acid. Acet., . . . . . . . . | ♏x. |
| Aq. Destillat, . . . . . . . . | f℥vj.—M. et ft. sol. |

One ounce or half an ounce every half hour or hour.

At the end of an hour from the administration of the first dose of opium, if the purging persisted, he gave one grain of opium and continued the astringent. A small teaspoonful, or two-thirds of an ordinary teaspoonful of this solution would contain about half a grain of the acetate of lead, and this might safely be given to a child a year old for several doses. We have not used this remedy ourselves, but it comes from a source which commends itself to us, and we shall not hesitate to use it when the occasion presents itself. As soon as the frequency of the discharges is arrested, the doses should be given at longer intervals, and when the peculiar serous character of the stools has disappeared, this remedy ought to be suspended, and some more simple one substituted, in order to avoid the possibility of producing the toxic action of lead.

If, in spite of the treatment, the stage of *collapse* should set in, other methods of treatment must be adopted. Here the stools are usually in great measure arrested, or they are few in number and small in amount. The object to be sought after is to produce reaction, or rather to favor the efforts of nature to bring about this change. It is now generally acknowledged by men of large experience, that the old plan of pouring in large doses of opium and alcohol is a great mistake. But little is absorbed by the stomach whilst the body is in this condition, and not unfrequently the patient is injured, perhaps fatally, by the sudden absorption of these substances, when the stomach begins to act after reaction has taken place. The opium may cause dangerous or fatal stupor, or may increase or keep up the tendency to suspension of the urinary function, and thus promote one of the great dangers of the disease, uræmic intoxication. The alcohol, if it has been used in large quantities, would also tend to clog the nervous centres, to cause gastric or gastro-intestinal catarrh, and to heighten beyond a safe point the febrile movement which is so apt to accompany the reaction stage. Opium, therefore, should be avoided during collapse, or given only in the smallest doses. Alcohol, though it should never be given in large doses, and recklessly, as has so often been done, may be used in small quantities, especially if it be found by close watching, that it promotes the force and volume of the pulse. Ten or fifteen drop doses of old and delicate brandy, in a teaspoonful or tablespoonful of ice-water, may be given every hour or two hours, at one year of age. During collapse the stomach is still often very irritable, and yet the thirst continues intense. We are glad to find that such men as Drs. Maclean and Goodeve recommend the free use of ice and water under these circumstances. Our own practice, for years past, has been to allow ice and cold water, almost without limit, to children in this condition, and we are much pleased to know that such, too, is the practice of these gentlemen. We never could understand the wisdom of refusing water to patients who were suffering the horrid thirst produced by the immense losses of the water of the body by serous purging. The degree of thirst for water (a natural and not a secondary diseased instinct, like that of the drunkard for alcohol) must be the safest guide we can have as to the need of the body for water, and as such, it ought always, it seems to us, to be gratified, unless under very rare and most peculiar conditions. We give water and ice, even though the child vomits from time to time, believing and hoping that some will be absorbed to take the place in the tissues of that which has been drained off through the intestines. This point in the treatment we regard as so important, and one, we think, so much misunderstood by the public and by some medical men, that we make the following quotation from a note of

Professor Maclean's to Dr. Aitken (*Aitken's Practice*, vol. i, foot-note, page 663): "Urgent thirst is one of the most distressing symptoms in cholera; there is incessant craving for cold water, doubtless instinctive, to correct the inspissated condition of the blood, due to the so rapid escape of the *liquor sanguinis*. It was formerly the practice to withhold water—a practice as cruel as it is mischievous. Water in abundance, pure and cold, should be given to the patient, and he should be encouraged to drink it, even should a large portion of it be rejected by the stomach; and when the purging has ceased, some may with advantage be thrown into the bowel from time to time." The use of water by enema, when the diarrhœa is checked, is a point which ought not to be neglected, especially if the stomach continues weak and irritable. A gill of tepid water may be used at a time, thrown slowly and gently into the bowel, in the case of a child one or two years old. If this is retained well, the same quantity may be repeated in one or two hours.

Whilst the collapse lasts, but little food can be taken. It is seldom retained if used in any quantity, and the stomach has lost, in great measure, its digestive power. The only food we have found at all available has been thin chicken tea, Liebig's cold extract of beef, or weak wine-whey, given in two or three teaspoonful doses, every half hour or hour. It is worse than useless to attempt more than this, as not only is it not retained, but it evidently tends to keep up the nausea and vomiting, and thus retard the natural effort at reaction. As to remedies in this condition, we doubt whether anything better can be done than to use water, as just advised, and small doses of brandy, and, if they can be borne, small quantities of the liquor ammoniæ acetatis, ten to twenty drops, in cold water, every hour, at one year of age. There is, however, a remedy which has obtained a great reputation amongst the English army surgeons in India, for the promotion of reaction in the collapse stage of epidemic cholera, which we have used ourselves with advantage in adults, but not in children, though we propose trying it when we next have a good opportunity. It is spoken highly of by Dr. Maclean. The formula is as follows:

℞.—Ol. Anisi, Ol. Cajeput, Ol. Juniper, āā, . . fʒss.
Æther, . . . . . . . . f℥ss.
Liq. Acid. Halleri, . . . . . . fʒss.
Tinct. Cinnamom., . . . . . . f℥ij.—M.

The dose for an adult is ten drops every quarter of an hour, in a tablespoonful of water.

An opiate may be given with the first and second doses, but should not be continued, for the reasons already given. The liq. acid. Halleri consists of one part of concentrated sulphuric acid to three parts of rectified spirit. The dose of this mixture for a child a year old, ought, we think, to be about one or two drops in a teaspoonful of water, given, as above stated, every quarter of an hour. So much is this valued in India, according to Dr. Maclean, that it is always ordered to be kept in store in the "medical field companion" of armies on the march.

It must not be supposed that all children seized with choleraic diarrhœa are necessarily to pass through the collapse stage in all its terrors. On the contrary, many, when judiciously treated early in the disorder, escape collapse altogether, and yet they have had none the less the true choleraic disease. Others suffer more profuse and exhausting losses of water by the discharges, or their vital power of resisting disease is less, and they pass into more or less deep collapse; or hang, as we have seen them, on the very edge of that condition, for one or two days, and then emerge from the danger, without having done more than cause the experienced physician the grave anxiety which such suspense must and ought to create. During these doubtful moments of the attack, the child should be kept as quiet and still as possible. He should be made to lie in a constantly horizontal position, on a smooth and easy mattress, in the crib, or on a large and roomy bed, and as little as may be on the lap, which is uneven and unsteady, and which must give his weak and exhausted muscles more work to do than they would have on the more solid and even bed. If, however, the nature of the child be such that he clings to the mother's or nurse's lap as his only safety, or if he have been taught (a most ill-judged lesson) to prefer the lap to any other position, we must yield to him, rather than cause fretting or unhappiness, when his very life may hang upon the avoidance of all disturbing influences. In this case, it is well to place him upon as firm a pillow as can be found, and let him be held on this in the lap. It is important to move him, when this becomes necessary, as slowly and gently as possible, always keeping the body on a horizontal plane, to avoid the tendency to the syncopal state, which sudden movements, and especially the sitting or erect position, are apt to produce. When the tendency to cooling of the body shows itself, and this is usually first noticeable in the hands and feet, ears and nose, he should be kept wrapped in warm, dry, and soft flannels or blankets. Flannels heated at the fire, thus supplying dry artificial heat, are of great use here. Bottles or tins filled with hot water, ought to be placed at the feet, under the blanket. A warm, soft, and light poultice of Indian meal or flaxseed, with a little mustard incorporated with it, may be placed over the abdomen, or three or four thicknesses of flannel wrung out of hot water and whiskey, may be laid over the lowest part of the thorax and over the abdomen, and covered with oiled silk, to retain their heat and prevent the wetting of the clothes. Whilst artificial heat is thus made use of, fresh air must not be excluded. On the contrary, as these cases almost always occur in the hottest summer weather, the largest supply of fresh air that can be obtained must be admitted. Warm baths, which were proper and useful during the early stage, especially when fever was present, we have not found useful in these cases. The fatigue and irritation caused by the disturbance of undressing and dressing the child, have seemed to us to do more harm than any good derived from the heat of the water compensated for.

When the case takes a favorable turn, and the *reaction stage* begins, it is usually best to do nothing more than supply food and water carefully, and keep the body quiet and tranquil. The food may be cautiously and slowly increased in quantity, if the stomach has become settled.

Tablespoonfuls of thin chicken-tea, just flavored with salt, or of Liebig's cold extract of beef, or of light beef-tea, or of a mixture of wine-whey with two or three parts of thin arrowroot decoction (a teaspoonful to a pint), may be given every half hour or hour. If these are retained several times, and the child shows some little anxiety for food, the same materials may be given in wineglassful quantities. At the same time, water and ice ought to be allowed from time to time, as the thirst may call for them. On the second or third day of the reaction, we may give, if the child shows a desire for it, a little milk and water and lime-water, one part of milk to one or two of water, with one of lime-water, commencing with not more than two or three ounces of the mixture at each feeding. The milk ought certainly to be very much diluted for the first three or four days after it is allowed. When the child has been carried thus far safely, we may gradually return to its former habits of feeding, allowing meat to suck, a little bread, and so on, if it is old enough for such habits.

As to drugs during the reaction stage, they are not necessary if everything goes on well. If, however, the fever run high, we may use small doses of the spirit of nitrous ether, as ten drops, in iced-water, every two hours at one year, or twenty drops of the solution of acetate of ammonia, in the same manner, at the same age. If, as often happens, the urinary secretion remains scanty, water, in such quantities as the stomach takes willingly, makes probably the best diuretic; or we may use the spirit of nitrous ether, as just recommended, with a grain of acetate of potash and half a drop to a drop of tincture of digitalis, every two hours, for a day or two.

When reaction is thus successfully brought about, the child may either improve rapidly and regain its previous health, or simple or inflammatory diarrhœa may set in, and pursue the usual course of those disorders. In the latter event, the child, if the attacks of cholera have occurred in the city, ought certainly to be removed to the country if possible, since it is only too apt to have a recurrence of the choleraic disease if kept in town, or to suffer, at least, a tedious and more or less dangerous attack of the simpler form of diarrhœa. For the proper treatment of either of these sequences to cholera, the reader is referred to the articles on those diseases, with the warning, however, that all such patients ought to be treated with every minute care as to hygienic and therapeutic measures that experience and art have taught us, since the health has been so rudely shaken by the sickness already endured.

We have now laid before the reader, to the best of our ability, what we think is the best method of treating cholera in children; but, before quitting the subject entirely, we wish to make a few remarks upon points not referred to in the above account.

Attention to the *state of the gums* should never be neglected in teething children. Our experience leads us to believe most implicitly that the process of dentition, or at least that and other concomitant constitutional conditions, are constant predisposing causes of gastro-intestinal disorders in early life, and that the active hyperæmic state, or positive acute inflammatory condition, which often attends upon the near approach of teeth to the surface of the gum, may become an exciting cause of acute digestive diseases, such as cholera. We think it is always well, therefore, to examine into the state of the mouth in a choleraic child as in other infantile disorders; and if the teeth are felt distinctly through the gums, and the gums be found swollen, tense, hot, and highly vascular, to cut them freely once. If, on the contrary, the gums are firm, not hot, not redder than usual, and the edges of the teeth cannot be felt, it is foolish meddlesomeness to cut them.

*Baths.*—In the early stage of cholera, before collapse has begun, and whilst the child is still reasonably strong, and particularly when there is marked febrile heat and dryness of the body, we think that the use of the warm or hot bath, or of sponging with hot water and spirit, are excellent measures. The bath may be used twice, or even three times a day if the child does not resist and scream. The temperature should be 95° to 98°, and the child may be kept in the water from five to ten minutes. It is an excellent plan to wrap the child, directly on lifting it from the bath, in a heated muslin sheet, and to apply over this a blanket, and keep it thus enveloped on the lap for half an hour or more if it is comfortable and disposed to rest. If the child be somewhat weak, whiskey, added to the water, renders the bath more useful and safe. When the use of a bath alarms or annoys so as to cause violent agitation, it is best to substitute sponging with hot water and whiskey or vinegar, under a light blanket, two or three times a day.

*Antiphlogistics.*—It may appear to many, in these modern times, a mere waste of words for us to state that we are opposed to bloodletting in any form or at any stage of cholera infantum. But if any such will take the trouble to look over the works of writers of ten and twenty years back, he will find reason to think that if this be our opinion, it ought to be expressed. When one of ourselves began to practice, in 1841, it was quite the custom to take blood for the nervous symptoms which are present in the early stage, and still more for the comatose phenomena at the close. This was done on the theory that these symptoms were the result of congestion or inflammation of the brain, whereas now they are looked upon as the results of exhaustion, of the altered conditions of the blood, or of uræmia.

*Calomel.*—The opinion was expressed in the last edition of this work, that the doses of calomel usually recommended were too large for young children, and were apt to aggravate the existing irritation of the digestive mucous membrane; and that such doses of a remedy acknowledged to be a powerful sedative, could not be proper in a disease which constantly tended towards exhaustion and collapse. It was also stated that the small doses which we did recommend had been declared by some critics to be entirely too small, and that to this we could only reply that the larger and more careful, and, we hoped, the wiser our observation had been in the last few years, the more thoroughly convinced were we that the larger doses, such as were formerly recommended and used by nearly all writers and practitioners, were not only unnecessarily large, but most seriously objectionable. We went on to say that the indiscriminate use of this remedy, in nearly all cases of the gastro-intestinal diseases of childhood became with some, we believed, a mere routine habit,—that they never tried what might be accomplished without it, but went on pushing the drug in constant doses, when the case, if trusted to simpler means, or even left to the efforts of nature, would often do much better, we had learned to believe, than when these delicate organs were made the receptacle of doses that could not but tend to keep up the nausea, and vomiting, and diarrhœa, which form so important a part of the morbid phenomena. The experience we have had since that time has but confirmed us in these opinions. Indeed we have so often been disappointed in obtaining any good effects from this drug, and have so often had reason to think that, instead of allaying nausea and vomiting, it increased them, and added to the exhaustion which is one of the dangers always to be contended against, that we have virtually abandoned it. We will add that the conclusions reached by the Edinburgh Committee of the British Medical Association as to the want of power of mercury to increase the flow of bile from the liver, which has been the great theoretic argument for its use in most of the gastro-intestinal diseases of children, have tended to confirm our doubts as to its utility in cholera. Not that we think that conclusions reached by experiments on animals should weigh against the careful experience of competent medical men, but when they come to confirm doubts raised in ourselves by actual observation of the sick, we cannot but take them as confirmatory evidence of the correctness of these doubts.

## ARTICLE IV.

### DYSENTERY.

It seems to us unnecessary to make more than a few remarks on dysentery, since we have already spoken of the morbid conditions of the large intestine, in our article on entero-colitis. Dysentery, however, differs from this latter affection by the fact that it frequently occurs in an epidemic form, and that there is a tendency to more rapid and extensive ulceration of the mucous membrane of the rectum and colon. It is an acute febrile disease, characterized by frequent evacuations, attended with more or less severe pain and straining, and consisting of muco-sanguinolent or sanguineous substances, which are due to ulcerative inflammation of the rectum and colon.

The *causes* of dysentery are but little understood, beyond the mere facts that it occurs as an endemic in some regions of country, and as an epidemic over large districts. It is frequent, also, as a sporadic disease, and in this form seems to depend upon the same causes as those already cited as productive of entero-colitis. Like cholera infantum, it appears to be more common in boys than girls, since of 39 cases of which we have kept notes, in which the sex is mentioned, 27 occurred in boys, and only 12 in girls. It is most frequent in the second and third years of life. Of 38 cases in which the age was noted, 1 occurred in the first year of life, 15 in the second, 7 in the third, 3 in fourth, 3 in the fifth, 1 in the sixth, 3 in the seventh, 3 in the eighth, and only 2 from the eighth to the end of the eleventh year. It may be either idiopathic or secondary. As a secondary affection it is most apt to follow measles and variola. We have often known dysenteric stools to occur in the course of cholera infantum, and in a considerable number of cases such as we have described under the title of entero-colitis.

The *anatomical lesions* are confined chiefly to the large intestine, and are the same as those described under the head of entero-colitis, except that they are of a graver character. The mucous membrane is commonly found thickened, swelled, red, and softened; the submucous tissue sometimes presents ecchymosed points; the follicles are often diseased, their orifices being enlarged and ulcerated, as described under entero-colitis. In grave cases, particularly those occurring under an epidemic influence, there are usually more or less extensive ulcerations, which may implicate only the mucous, or extend to the muscular or even peritoneal coat. In such instances, pseudo-membranous exudations are often formed, sometimes in large quantity, and often covering the ulcerations. The intestine contains sanguinolent mucus, or at times a brownish or greenish material, which is evidently the result of a gangrenous condition of the mucous membrane, pus, and lastly false membranes. In some rare cases, perforation has been known to take place.

SYMPTOMS.—The symptoms are much the same as those already described as existing in entero-colitis, excepting that the local symptoms are more severe, and the presence of blood in the stools constant. The disease often begins as a *diarrhœa*. The *stools* at first contain feculent materials, but after a time become very thin, small in quantity, and consist chiefly of mucus mixed with blood. The blood may be black and in considerable quantity, or of a dark rosy red color, or like the washings of flesh; it is mixed with greenish or yellowish substances, whitish mucus, fragments of false membrane, or purulent fluid. In young children there is evidently *pain*, from the restlessness, moving of the limbs, and crying about the time of the evacuations, while in those who are older, there is true *tenesmus*, like that observed in adults, and severe pain in the anus. The number of stools varies according to the severity of the case. There may be only four, eight, or ten in the day, or many more. We have quite frequently known as many as 30 and 40 to be voided in the twenty-four hours, and in fatal cases, the dejections sometimes number three or four in an hour, while between the discharges the child often suffers from most violent and painful tenesmus.

The *abdomen* is generally distended, tympanitic, warmer than natural, and painful.

In mild cases there is usually no *fever*, or very little, while in severe attacks, there is high fever during the first few days, marked by frequent pulse, hot dry skin, followed after a time, unless a favorable change takes place, by coolness of the surface, contraction of the countenance, hollow, sunken expression of the eye, rapid emaciation, and death.

It is useless to give a longer detail of the symptoms, as they are the same as those already described in the article on entero-colitis.

The *diagnosis* presents no difficulties. The frequency of the discharges, the pain in the course of the colon and in the anus, the tenesmus, the character of the evacuations, and the febrile reaction, all make the disease easy of recognition.

The *prognosis* is favorable in mild cases, unattended with much fever, or very frequent discharges. When, on the contrary, there is violent fever in the beginning, followed by disposition to coolness and collapse; when the stools are exceedingly frequent, and attended with severe pain and almost constant straining; and when they consist of nothing but mucus, mixed with considerable quantities of blood, or with pus or false membranes, the prognosis is very unfavorable. Of 36 cases, the termination of which we have recorded, 4 proved fatal.

TREATMENT.—The treatment of dysentery in children is often very unsatisfactory. The mere variety of the remedies recommended by different writers and practitioners marks the uncertainty of the effects obtained from drugs. Mild cases so generally get well under any treatment that all methods have had their supporters and advocates, while grave cases, and especially those occurring under the influence of severe epidemic visitations, are so difficult of treatment, and often so little under the evident control of medical means, as to leave the careful observer in great doubt as to what he ought to set down as the evident result of his own interference in the case, and what as the results of the efforts of nature to cure the disease.

Mild cases of the disease, in which the fever is not very high, the number of stools not great, and the pain and distress moderate, require little else than *rest* in bed, a light and unirritating *diet*, and the use of *opium* in small quantities either internally or by injection. When there is reason to suspect the presence of unwholesome food in the stomach, or of unhealthy secretions in the intestines, it is necessary to give in the beginning small doses of some mild *cathartic*. The one generally preferred is castor oil, which may be given either simple, in the dose of a small teaspoonful containing one to four drops of laudanum according to the age, or in the form of emulsion. The latter is the mode of employing it usually chosen. A drachm of oil should be rubbed up with a scruple of gum, a little sugar, from two to eight drops of laudanum according to the age of the child, and seven drachms of some aromatic water. The dose is a teaspoonful every three or four hours. If the case continue to improve under the emulsion, it may be continued for a couple of days, but should the stools become more and more frequent, and the pain and tenesmus increase, it must be suspended after one or two days, and laudanum enemata, with or without the internal use of absorbents and astringents, substituted. The injections ought to consist of four or five drops of laudanum at two years of age, and of ten drops at five or six years, suspended in from half an ounce to an ounce of some mucilage, or thin farinaceous fluid, or simply mixed in a tablespoonful of tepid water, which is perhaps the best plan of all. The injections may be given every four or six hours if necessary, or they may be made use of only at night, while small doses of Dover's powder are administered every three or four hours through the day.

The *diet* in these cases should consist of arrowroot, sago, tapioca, or some such food, made into thin pap with milk and water; and the quantity allowed ought to be very moderate. Rest in bed, in the cradle, or in the lap, is very important. The child ought not to be allowed to run about, or use exertion of any kind.

Where the pain is severe and the fever high, and where there is a good deal of soreness in the abdomen, *depletion* may with propriety be resorted to, but always with moderation and prudence. A few leeches applied around the margin of the anus, or to the surface of the abdomen, often prove of great service in relieving pain and tenesmus. An occasional *warm bath* is very soothing and useful.

In very severe cases of dysentery the treatment is, as above stated, difficult and uncertain, owing to the dangerous character of the disease, and to the fact that so many different methods have been recommended by different writers.

In the early stage of a severe case, whilst the febrile reaction is high and the strength of the patient still unsubdued, depletion by leeches in young children and by venesection in older ones, is strongly approved of by many able practitioners. For our own part we have not resorted to it as a general rule, from the fact that we have so often found the strength of the child to fail rapidly under the disease itself. In a few of our cases, however, leeching around the anus has been followed by manifest benefit. The remedies most commonly depended upon are castor oil, in emulsion with laudanum, mercury, sugar of lead, opium, nitrate of silver, spirit of turpentine, and astringents. The castor oil emulsion, prepared as mentioned above, is useful in the early part of the attack, but ceases to be so, according to our experience, after the first twenty-four or forty-eight hours. From mercury we have not ourselves obtained any very positive benefit, though, in combination with opium and ipecacuanha in small doses, it is much thought of by many excellent authorities. The only remedy which is used by all, though it is rarely given alone, is opium, and the very fact that it is so universally employed points it out as one of the most reliable and valuable means we have at our command. It is certainly the one upon which we most depend ourselves. It may be given either alone or in connection with other substances. Where injections can be retained it is best given in that way. About five drops of laudanum at two years of age, or ten drops at four or five years, may be given in a tablespoonful of any bland vehicle every four hours. When the rectum rejects the enema as soon as administered, the opium should be given either by the mouth, in the form of laudanum or solution of morphia, or in that of Dover's powder; or in the form of suppository. We should indeed strongly rècommend the administration of opium in this latter form in such cases, since we unquestionably obtain a certain beneficial was discharged. Inflammation and suppuration of the pericœcal tissue does indeed occur as an idiopathic affection, or from extension of inflammation from the cœcum, but it is of extremely rare occurrence; and there can be no doubt that nearly all cases of iliac abscess are due to perforative ulceration of either the cœcum or appendix. As Bouchut suggests, one proof that most cases of non-puerperal iliac abscess are thus due to perforation of the cœcum or appendix, is afforded by their almost constant occurrence upon the right side. Thus of 57 non-puerperal iliac abscesses collected by Grissolle, 9 only were on the left side; while of 26 puerperal ones, 15 were on that side.

It is necessary, however, to carry this question one step further, and to determine, if possible, the relative frequency of perforation of the cœcum and of the appendix. It has been supposed, as by Ferrall, that ulceration of the cœcum is in most cases the starting-point in the development of the lesions. But, while we are in possession of a sufficient number of recorded cases, 12 of which we have collected, where post-mortem examination has proved the abscess to have originated in perforation of the cœcum, there is good reason to believe that perforation of the intestine is much more frequently found associated with disease of the appendix than with ulceration of the cœcum itself.

CAUSES.—In addition to the anatomical peculiarities of the cœcum and appendix, which must be regarded as predisposing causes of these affections, there are other conditions which exert an unquestionable influence.

The *strumous diathesis* has been regarded as a predisposing cause of diseases of the cœcum and appendix. It does not appear, however, that inflammation of these parts is more frequent in strumous subjects, but merely that it has a greater tendency in such patients to run on to ulceration and perforation of the bowel.

*Age.*—The greater irritability and proneness to inflammation which the intestinal canal presents in early life, appears to have its effect upon the development of typhlitis, since a considerable majority of reported cases have occurred under the age of 25 years. This is particularly true of the milder attacks, which are not attended with ulceration. Thus, of 38 cases of typhlitis at all ages, which recovered without perforation of the bowel, 29 occurred at or under the age of 25; 9 only were in older persons. Of these 38, 13 occurred in our own practice, and were aged as follows: 2 under 6 years; 6 between 6 and 12 years; 5 between 12 and 15 years. Finally, 19 of the 38 cases occurred at or under the age of 15 years. This does not appear to hold true, however, with regard to perforative ulceration of the cœcum and appendix.

We have not met with any case of perforation of the cœcum occurring during childhood, but of 25 cases collected from different sources, 13 occurred after the age of 25; 12 at or under that age. Of these 25 cases, 12 only were verified by post-mortem examination, of which 3 were under 15 years of age, 2 between 15 and 25 years, and 5 above 25 years.

Of perforation of the appendix vermiformis, we have met with 3 cases in children, aged respectively $4\frac{1}{2}$, 8, and 11 years. Of 25 other cases, collected from various sources, in which the age is stated, 9 were above, 16 below 30 years of age. Of these 16, 3 only were under 15 years of age, so that, including our own 3 cases, we find 6 cases occurring under 15 years, 13 between 15 and 30, and 9 above 30 years of age.

*Sex.*—The influence of sex has been very variously stated by different observers. It appears, however, that males are somewhat more prone to all these forms of disease than females. Thus, of 39 cases of typhlitis, which recovered without perforation of the bowel, 23 were in males; 16 only in females. Of 13 of these 39 cases, which we observed in children, 8 were males and 5 females.

Of 25 cases of perforation of the cœcum, 13 occurred in males; 12 in females.

The sex is stated in 27 of 32 cases of perforation of the appendix. Of these, 21 were males; 6 only were females. Of 6 cases occurring under 15 years of age, the sex is stated in 5, 4 of which were males.

*Occupation.*—Various occupations, especially those involving sedentary habits, have been supposed to predispose to these affections, as also the practice among females of wearing tight corsets. Experience, however, has not verified these suppositions.

*Constipation.*—A constipated state of the bowels undoubtedly predisposes to these affections by favoring the production of a distended and impacted condition of the cœcum, even if the presence of the hardened fecal matter does not prove the exciting cause of some cases of typhlitis. Rokitansky considers this cause so important that he has given the name typhlitis stercoralis to one form of inflammation of the cœcum.

EXCITING CAUSES.—*Cold and Exposure.*—The action of these ordinary exciting causes has been denied by some observers on account of the frequent absence of a chill or rigor at the inception of the attack, and the development of the local before the general symptoms. It cannot, however, be doubted that typhlitis may be idiopathic and arise from the ordinary exciting causes, though the cases are comparatively rare.

*Food.*—In several instances the attack appears to have been brought on by the use of indigestible or irritating articles of diet, among which may be especially mentioned unripe acescent fruits. It has been said that the use of oatmeal, which favors the formation of intestinal concretions, is also liable to be followed by this disease. It does not, however, appear that typhlitis is any less frequent in countries where wheaten bread is used, than in those where oatmeal forms a chief part of the food.

*Blows or Exertion.*—There are a few cases recorded in which a blow upon the abdomen, or a sudden violent strain, appears to have been the immediate cause of an attack of typhlitis.

*Foreign Bodies and Intestinal Concretions.*—This class, comprising very various substances, certainly forms the most important and frequent cause of diseases of the cœcum and appendix.

We cannot be positive as to the amount of influence they exert in the milder and more tractable cases of simple typhlitis, though it is quite probable that many of these are caused by the temporary arrest of some foreign substance in the appendix, or one of the pouches of the cœcum. Thus, in a case reported by Dr. Wynn Williams (*Lancet*, January 25th, 1862), in a male adult, three months after a well-marked acute attack of typhlitis, which yielded to judicious treatment, a large intestinal concretion, having a plum-stone for a nucleus, was passed by the rectum. They are, however, the efficient cause of a large majority of all the cases of perforative ulceration of the cœcum and its appendix.

The diseases of this latter part, however, are far more uniformly dependent upon the presence of foreign bodies even than in case of the cœcum; almost three-fourths of all recorded cases of perforation of the appendix having been due to this cause. In 6 cases occurring in children, some extraneous substance was found in the appendix in each one: in 2 a foreign body was present; and in each of the other 4, an intestinal concretion.

Many of these bodies are true intestinal concretions, having for their nucleus merely a nodule of hardened fæces or inspissated mucus. They vary considerably in size, the majority of them being about the size of a cherry-stone or date-stone, though Habershon mentions having seen one as large as a hen's-egg. They are also of very varying consistence, according to Volz, as quoted by Hanbury Smith, constituting three varieties: the soft, resembling excrement in appearance and odor, and having a nucleus of hardened fecal matter; the semi-hard, of a grayish-brown color, consisting of shining concrete layers, with a nucleus which is not a foreign body; and the stony, which are of a grayish-white or earthy color, and have a surface from which may be detached delicate scales, or which is smooth, shining, yellowish-white, or brown, and studded with calcareous projections.

Many of these concretions consist of carbonate and phosphate of lime united with inspissated mucus. Copland also mentions one which consisted of cholesterine.

In addition to these, however, numerous foreign bodies have been found in connection with the cœcum or appendix, either free or forming the nucleus of an intestinal concretion. Among these may be mentioned grape-seeds, cherry-stones, date-stones, pins, bristles, fragments of glass, biliary calculi, and balls of worms, either ascarides or lumbricoids.

It may not be amiss to remark, here, that some intestinal concretions resemble, to a marked degree, the seeds or stones of different fruits, particularly of the cherry, date, and plum; and there is no doubt that many of the bodies found in the cœcum or appendix, and reported as cherry-stones or date-stones, have been in reality intestinal concretions.

Whatever be the nature and origin of these bodies, it is probable that in many cases some morbid condition of the mucous membrane of the cœcum or appendix precedes their formation or lodgement, and the development of the grave symptoms which often follow.

As Habershon justly remarks, the ordinary calibre of the appendix is so extremely small and so thoroughly lubricated, that it must be very rare for any extraneous substance to become impacted in it so long as it remains healthy. A further argument in favor of this view is the fact that the presence of these concretions is attended by the most varying results, since very large and irritating bodies have been occasionally found occupying the cavity of the appendix without having produced any symptoms during life, or any inflammation of its surface; while, on the other hand, minute concretions of semi-solid consistence, and apparently unirritating in character, have frequently been observed to act as the foci of the most serious and destructive inflammatory action.

Anatomical Appearances.—In the simple forms of typhlitis, the mucous membrane of the cœcum presents the usual appearances of inflammation; the peritoneal investment is also involved, and besides injection and opacity of this membrane, there are adhesions formed between folds of the intestines.

When, however, ulceration is present, as often results from the presence of foreign bodies, or in strumous subjects, it is a matter of the utmost importance which portion of the cœcum is involved, since, as such ulcers have a strong tendency to perforate the coats of the bowel, if they occur on the anterior part of the cœcum, which has a peritoneal investment, there is the greatest danger of an escape of the contents of the bowel into the peritoneal sac, and the development of rapidly fatal peritonitis. Thus, of 10 fatal cases of perforation of the cœcum, in which the seat of the perforation was determined by post-mortem examination, the anterior wall was involved in six instances. If, on the other hand, the ulcer be seated on the posterior part of the cœcum, where it is attached to the iliac fossa by connective tissue, and devoid of a peritoneal covering, perforation is not directly followed by any such unfortunate results. Inflammation is excited in the pericœcal connective tissue, suppuration ensues, and the resulting abscess follows one of several courses, precisely as in idiopathic suppuration of the pericœcal tissue. Thus it may reopen into the bowel; may burrow along the sheath of the psoas muscle, and point below Poupart's ligament, or it may discharge in the lumbar region, or at any point along the crest of the ilium.

In one case the iliac artery was opened, leading to speedy death from hemorrhage.

Occasionally these abscesses discharge themselves by more than one avenue, as for instance through the bowel, and in the groin or iliac region simultaneously. When, as occasionally happens, the inflammation of the cœcum passes into a chronic form and the ulcerative process ceases, the adhesions of the cœcum to the iliac fossa become preternaturally dense, the cœcum itself is contracted, its coats thickened, and the mucous membrane almost entirely destroyed, or converted into a retiform and trabecular fibroid tissue. Rokitansky has found in such cases the cœcum converted into a slate-colored capsule, with dense parietes, of the size of a walnut or a pigeon's egg.

The *appendix vermiformis* may be the seat of catarrhal inflammation, associated with inflammation of its peritoneal covering. Death does not result from this condition, but the pathological appearances are probably analogous to those found in all cases of localized sero-enteritis.

When, however, the appendix has been the seat of ulceration, and death has resulted before perforation has occurred, its cavity is found distended with pus, its mucous membrane deeply ulcerated, and in nearly every instance, a foreign body or an intestinal concretion is present.

The ulceration of the appendix varies in its position and extent, at times being seated at the free extremity, at others occupying the lower third of the appendix, which is perhaps the more frequent seat. In regard to its size, the ulcer and the subsequent perforation may be either very small, or else may involve almost the entire circumference of the appendix.

Under favorable circumstances, especially if the foreign body is discharged, the ulceration ceases, and the appendix becomes converted into a ligamentous cord, its calibre being entirely obliterated.

When perforation of the appendix occurs, the results vary according to the degree of local peritonitis which has been excited. If the appendix has become strongly adherent at the point where perforation is about to take place, this accident may not be followed by the development of general peritonitis. The points to which the appendix generally becomes adherent, are the cœcum, the anterior abdominal wall, and the right iliac fossa. In the first case, the circumscribed abscess which follows the perforation of the appendix will discharge itself through the cœcum by effecting a perforation of its wall from without inwards, and this is the most favorable termination possible. When, however, the appendix has become adherent to the abdominal wall, or iliac fossa, the resulting abscess will follow the course, already described, of abscess from perforation of the cœcum.

It is in this connection that the various abnormal positions which the appendix may assume, are of importance, as determining the position in which the abscess will point.

Unfortunately, however, the adhesions are rarely strong enough to circumscribe the purulent matters escaping from the appendix, so that these generally find their way into the peritoneal cavity, and excite general peritonitis.

We subjoin the histories of 3 fatal cases of perforation of the appendix from intestinal concretions, occurring in children, in all of which some local peritonitis with adhesions had occurred, but had not sufficed to prevent the above unfortunate termination.

CASE 1. *Intestinal concretion in the appendix cœci, causing perforation and fatal peritonitis.*—T. D. S., a healthy, well-grown boy, 11 years of age, rose on the morning of December 25th, 1860, apparently quite well. Soon afterwards, however, he complained of pain in the right iliac and lumbar regions, was chilly, and returned to bed. A dose of castor oil was given him. In the course of the day fever came on.

Next day he was feverish, with a pulse of 132, a hot and dry skin, and a moderately furred tongue. The pain still continued, with tenderness and slight distension of the abdomen on the right side; there was no vomiting. His bowels had been acted upon three times by the oil. Leeches and a poultice locally, and a mixture of blue pill with rhubarb syrup internally, were ordered.

On the 27th and 28th the symptoms were much the same, except that the tenderness and distension increased. The pain was aggravated by coughing, by a full inspiration, and by motion, especially of the right leg. The bowels were slightly moved by the mixture; no vomiting as yet. His fever continued, but the pulse fell to 108, and his skin was somewhat cooler.

On the 29th he was worse. All his symptoms were aggravated, and vomiting set in; his bowels became confined. Small doses of calomel and opium were given, enemata of various kinds were tried, and rhubarb syrup with a little fluid extract of rhubarb was perseveringly employed, but without effect. The abdomen now became greatly distended, exceedingly sonorous, and painful; the stomach grew more and more irritable, rejecting from time to time, towards the last, with a sudden, spasmodic effort, everything that was taken by the mouth. The bowels were completely obstructed, so that repeated injections of various kinds elicited no discharges, even of flatus. The urine continued to be secreted to the last; and there was at times, in spite of the nausea and vomiting, quite a strong desire for milk and bread.

During the last few days wine-whey and beef-tea were given in small quantities; and opium by enema and by the mouth was used to allay pain. On the third day of the treatment a blister four inches square was applied over the seat of tenderness; but neither this nor any of the other remedies employed seemed to exert the least effect upon the course of the disease.

Death took place on the eighth day, January 1st, 1861.

The autopsy was made by Dr. Packard, twenty-four hours after death. Body large, muscular, and well formed; rigor mortis well pronounced. Abdomen only examined.

On making the usual section, several coils of small intestine, very greatly distended with gas, and markedly injected, with flakes of lymph here and there over the surface, at some points gluing the adjacent coils together, were seen concealing the rest of the abdominal viscera. After some search, the colon was found, very much contracted, except at the cœcum. The ileum was in like manner contracted, the narrowing beginning at about the end of the jejunum, which formed the distended coils above mentioned. No cause was assignable for the constriction at this point; but a little lymph was thrown out here, and it may have been that the bowel had been twisted.

The appendix vermiformis was bound down by peritoneal adhesions. Within it, near its origin, was a mass as large as a small bean, but perfectly oval. Just beyond this mass, at what seemed to have been its position, was an ulcer extending all round the tube, and of a gangrenous aspect. At the distal end of this ulcer was a perforation, by which matter had found an exit into the peritoneal cavity. The rest of the tube looked as if it had been distended by the pus before the opening was formed. After its escape from the appendix, the matter seemed to have caused a circumscribed peritonitis, in addition to the general one already indicated. The adhesions bounding this peritonitis had extended up to the liver, the convex surface of which was hollowed to a slight depth in an oval shape, the depression being lined by false membrane. The whole quantity of the pus was perhaps f℥iv.

The liver was pale in patches, but was not degenerated. Rather too large a number of oil-drops existed in a dark, inflamed portion of its substance, just beneath the depression above mentioned; but even here the quantity was not great. The mesenteric glands were swollen and injected over the surface. No other lesions were observed.

CASE 2. *Intestinal concretion in the appendix cœci, causing perforation and fatal peritonitis.*—C. B., æt. 4½ years, was taken sick with slight fever, pain in the abdomen, some vomiting, constipation, and inflation of the abdomen. With these symptoms there was marked tenderness in the right iliac fossa. After three days, the bowels were well opened and the fever subsided; the abdomen, however, continued inflated, and a small but distinct tumor had appeared just inside of the right anterior superior spinous process of the ilium.

He continued to improve, and was apparently much better, but was strictly confined to bed, when on the ninth day at 3½ P.M., he was seized with severe abdominal pain; symptoms of collapse rapidly appeared, and he died at 2 A.M., the following morning.

At the autopsy an intestinal concretion of the shape and size of a date-stone, was found in the appendix. The end of the appendix was perforated, and had become attached to the anterior wall of the abdomen, where a small abscess had formed in the cellular tissue between the peritoneum and the abdominal muscles, evidently seeking an outlet through the abdominal parietes. The wall of this had unfortunately ruptured into the peritoneal sac, and death had resulted in a few hours from general peritonitis.

CASE 3. R. P., a healthy girl aged 7½ years, died at the end of the second week of a well-marked attack of perforative disease of the appendix vermiformis.

At the autopsy a large, rounded intestinal concretion was found in the appendix cœci, which was perforated, allowing an escape of matter into the peritoneal cavity. There was marked general peritonitis, with the formation of a large quantity of pus.

SYMPTOMS.—Mere *distension* of the cœcum by hardened fæces, without actual inflammation of its coats, may be attended with constipation, some vomiting, and the presence of a somewhat sensitive tumor in the cœcal region. According to Copland, when the distension by accumulated matters is great, it may, from rising high in the abdomen and pressing upon the nerves, vessels, and ducts in its vicinity, occasion numbness and œdema of the right lower extremity, retraction of the right testicle, and derangement of the urinary secretion, so as to be mistaken for disease of the kidney.

*Inflammation of the mucous membrane only* of the cœcum, is generally attended with a moderate degree of fever, slight pain and tenderness in the right iliac fossa, and some diarrhœa, with mucous, offensive stools. This condition is not unfrequently chronic, and evinces its presence by no very positive symptoms, unless adjacent parts have become involved in the inflammation, or an acute attack of typhlitis supervenes.

TYPHLITIS, or inflammation of all the coats of the cœcum or appendix, usually appears suddenly during full health, or it may be preceded by slight intestinal derangement, such as diarrhœa or constipation.

*Pain.*—The earliest and most marked symptom is generally pain in the region of the cœcum, which appears suddenly, becomes fixed and constant, rarely remitting, and is greatly increased by a deep inspiration or by coughing.

This pain is attended from the very first with such exquisite tenderness on pressure in the right iliac region, that the weight of the bedclothes cannot be borne, and the patient shrinks from the lightest touch. To relieve this pain the patient lies toward the right side, with the thighs flexed upon the pelvis, and any attempt to draw the right leg down causes agonizing suffering. These local symptoms are usually confined to the right iliac fossa, though the entire peritoneum may become somewhat involved, and the symptoms of general peritonitis develop themselves.

*Fulness or Tumor.*—Owing to the distended state of the bowel itself, and to the adhesions formed between folds of the intestines, or in some rare cases to an inflammatory effusion behind the cœcum in the iliac fossa, there is marked fulness or even a well-defined tumor in the right iliac region. Frequently there will be merely fulness during the first few days of an attack, and then a distinct tumor will be developed. In 11 of 39 cases of acute typhlitis, recovering without perforation of the bowel, a distinct tumor was present. In most of the other cases the condition of the cœcal region is described as one of fulness or distension. Of these 39 cases, 19 occurred in children under 15 years of age, in only 3 of which a distinct tumor is recorded to have been observed.

*Constipation.*—The bowels are almost invariably constipated; in many cases very obstinately so. This constipation is frequently associated with quite severe tormina and tenesmus, and if the cœcum be much distended, there may be pain shooting down the right thigh, or numbness and even œdema of this part, together with retraction of the right testicle.

It is important to observe here, that in most cases, when once the constipation is relieved, and free feculent stools procured, the most threatening symptoms of the attack rapidly subside.

*Vomiting* nearly always attends in children; it was present in all of our 13 cases. It is never stercoraceous, and indeed is rarely troublesome unless the constipation is marked, or perturbating treatment has been adopted in the beginning of the attack.

*Fever.*—The attack is not usually ushered in by any chill or rigor; but marked febrile symptoms soon appear, the pulse becomes accelerated, the skin hot, the tongue furred, and the thirst extreme. These symptoms usually subside under appropriate treatment after a variable time, generally from four to twelve days; the bowels are opened freely, the pain and tenderness diminish, and the fulness in the right iliac region gradually disappears.

This description of symptoms applies to acute inflammation both of the cœcum and appendix, as there are no well-recognized differences in the

into the pericœcal tissue. When this latter event occurs, the consti
tional symptoms soon indicate the occurrence of suppuration, and hect
irritation, with rigors or marked chills succeeded by drenching sweat
colliquative diarrhœa, rapid prostration and emaciation, with a dry brow
ish tongue and feeble running pulse, soon appear. Despite the desper
character of these symptoms, however, recovery may take place if t
abscess points externally in the way already described, and does not op
into the peritoneal cavity. It is necessary to be aware that the appro
of a fecal abscess to the surface is not attended with the appearanc
which usually accompany the pointing of an abscess. Thus, instead
the skin becoming tense, prominent, and reddish, with a distinct sense
fluctuation present, the surface becomes doughy and dark-colored, a
upon palpation a distinct sense of emphysematous crepitation is oft
obtained. Upon incising such a point, a discharge of fetid gas a
grumous matter follows the puncture, and this peculiarity has more th
once led surgeons to believe that they had opened a knuckle of intesti

Perforative Ulceration of the Appendix.—The symptoms of th
disastrous condition closely resemble those of perforation of the anter
part of the cœcum. They are, however, often even more acute, the pa
is sudden and violent, and a distinct tumor is more uniformly presen
while, on the other hand, the symptoms of obstruction of the intesti
are not so well developed. Constipation and vomiting are not consta
in the early stage, and at a later period spontaneous diarrhœa may a
pear, but without any favorable result. The perforation of this part i
as already said, far more apt to be followed by general peritonitis; an
indeed, so far as we know, there is but one well-authenticated case
record of recovery after this accident, which was published by one
ourselves in the *Proceedings of the Pathological Society of Philadelphi*
(See *Amer. Jour. Med. Sciences*, vol. liv, July, 1867, p. 145.)

forms may discharge itself externally, into the bowel or into the peritoneal cavity.

DURATION.—Many attacks of acute typhlitis, when promptly and judiciously treated, yield on the second or third day; though the case is often prolonged to the ninth or twelfth day, and, in violent attacks, it may be many weeks before all local tenderness in the cœcal region passes away, and the function of the bowel is again completely restored.

When perforation of the cœcum occurs, the after-duration of the case depends entirely upon the point of perforation. If the ulcer have penetrated the anterior wall, general peritonitis is usually excited, and death results in less than forty-eight hours. But if, on the other hand, the posterior wall be perforated, a fecal fistula may be formed, and continue open for very many years. The duration of perforative ulceration of the appendix varies considerably. In 3 cases in children, observed by ourselves, the duration was respectively seven, nine, and fourteen days, with a mean of ten days.

In 11 cases, at all ages, in which the duration is distinctly stated, the mean duration was nine days, the extremes being two and a half and twenty-nine days.

Bamberger, however, gives the duration of seven cases, occurring at various ages, at from twenty to fifty days, with a mean of thirty-one days. It is probable, however, that this last mean is rarely attained in cases occurring in children.

PROGNOSIS.—Nearly all cases of simple acute typhlitis, without perforation of the bowel, recover under proper treatment. Indeed, there are no cases on record of acute typhlitis proving fatal, in which post-mortem examination did not show the existence of perforation of the cœcum or appendix.

When the cœcum has become the seat of chronic inflammation, however, death may result, either from the sudden development of acute peritonitis, without ulceration of the bowel, or from such contraction of the cœcum as finally to lead to obstruction of the intestine.

When perforation of the cœcum does not prove speedily fatal from peritonitis, but leads to the formation of an abscess in the iliac fossa, the prognosis of the case depends, in a considerable degree, upon the course taken by this abscess. Dupuytren regarded the reopening into the bowel as the safest termination of an iliac abscess, and the opening upon the surface of the body as almost universally fatal. Further experience has confirmed the truth of the first portion of this opinion, but has also established the fact, that almost one-half of the abscesses opening externally recover.

Perforation of the appendix vermiformis is invariably fatal, so far as our experience goes, if we except the case before referred to, where, in an old man about whose past history nothing could be learned, we found the appendix converted into a solid fibrous cord, with a small opening, near the free extremity, leading to its centre.

DIAGNOSIS.—The general diagnosis of most of these conditions is not attended with much difficulty. We have already mentioned that simple excessive distension and impaction of the cœcum is sometimes attended with severe pain, some tenderness, constipation, and even vomiting, and that these symptoms are relieved upon free action of the bowels being secured. We do not have here, however, the sudden attack occurring in a state of perfect health, as in typhlitis, nor the marked febrile symptoms; nor are the local signs in the right iliac fossa, and especially the peculiar, exquisite sensitiveness, nearly so well developed.

Inflammatory disease, in connection with the right ovary, with local peritonitis, is unquestionably sometimes mistaken for typhlitis. The local symptoms in the former affection are, however, lower down in the abdomen than is usual in typhlitis; there is not the well-defined tumor nor the obstinate constipation; and, in addition, there is generally the history of some menstrual trouble, or the attack occurs in immediate connection with the period of menstruation.

Pain in the course of the last dorsal nerve may arise from spine disease, or, in the course of the genito-crural nerve, from the passage of a renal calculus, and, according to Habershon, be confounded with cœcal disease. It is evident, however, that most of the characteristic symptoms of typhlitis would be absent, whilst a careful investigation of the case would probably educe more symptoms of the existing trouble.

The diagnosis of typhlitis from intussusception, an affection which presents many features of resemblance, will be fully considered in the article devoted to this latter disease.

Ulceration of the cœcum or appendix may be suspected, if the violent pain and the exquisite tenderness persist in the right iliac region, after the other symptoms of an acute attack of cœcal disease, especially the vomiting and constipation, have been overcome. Ulceration of the cœcum is much more apt to have been preceded by bowel complaint for some time; it is also much more rare than ulceration of the appendix.

In cases where we are consulted only after perforation has taken place, with the production of a fecal abscess, we must endeavor, by obtaining a most accurate history of the case, to establish the presence or absence of symptoms of inflammation of the cœcum at the beginning. And further, care must be taken to exclude the following conditions, all of which may at times simulate iliac abscess, namely: psoas abscess, or abscess connected with caries of the pelvic bones; abscesses in the walls of the abdomen, with local peritonitis, resulting from blows; suppuration originating in connection with the right kidney or its envelope; and finally, some cases of disease of the right hip-joint.

The differential diagnosis of these affections of the cœcum and appendix from one another is as yet scarcely possible. The following general remarks contain, perhaps, all that can be surely advanced:

Simple inflammation of the appendix presents symptoms of even greater acuteness and severity than those of simple cœcitis, and which do not subside so promptly after the bowels have been freely acted upon.

In ulcerative disease, both of the cœcum and appendix, the symptoms also persist after the constipation and vomiting have yielded.

Ulceration of the cœcum, however, is rare, and is apt to be preceded by symptoms of bowel complaint. Whilst ulceration of the appendix on the other hand, is often terribly acute, advancing from a state of apparent perfect health to perforation and death in forty-eight hours; it is also much more frequently attended with a distinct tumor in the right iliac region.

TREATMENT.—The indications for treatment in the acute stage of typhlitis are clearly to reduce the local inflammation of the peritoneum and intestine, to relieve the pain and tenderness, and to secure free and natural action of the bowels. At the same time, all perturbating and strongly reducing treatment is forbidden, by the knowledge that the attack is frequently caused by an irritating foreign body; and that, in a certain number of cases, perforation will occur, in which event the only hope of recovery often rests upon the adhesions which have been formed during the early stage, and upon the vigor of the constitution to resist a prolonged and exhausting process of suppuration.

*Depletion.*—The local abstraction of a few ounces of blood by the application of leeches to the cœcal region, should be practised in acute cases. This measure, while it does not seriously reduce the strength of the patient, relieves the pain and tenderness, and probably facilitates the action of the internal remedies employed. Beyond this degree, however, depletion is injurious, or, at least, unnecessary.

*Purgatives.*—The experience of all observers agrees in condemning the use of powerful, irritating purgatives at any stage of typhlitis. In the early stage, they aggravate the pain and inflammation, increase or establish vomiting, and frequently fail entirely in their object; while, on the contrary, the constipation which will resist the strongest, most drastic purgatives, will quickly yield to mild, saline, or vegetable laxatives.

It is a good plan to combine a small amount of opium with the laxative; since, so far from counteracting its operation, it appears, by allaying the intense sensitiveness of the bowel, to promote its painless and thorough action.

Burne recommends highly the following laxative draught, the dose of which is arranged for an adult:

| | |
|---|---|
| ℞.—Sodæ Sulphatis, . . . . . | ʒj. |
| Tr. Opii, . . . . . . . | gtt. v. |
| Inf. Sennæ, . . . . . . | f℥j. |

Ft. sol. S.—Repeat every four hours until the bowels are freely moved.

We have ourselves been led by experience to rely upon the combination of comp. ext. colocynth with opium, given in small and frequently repeated doses. Thus, for a child of from five to eight years, the following pill may be prescribed:

| | |
|---|---|
| ℞.—Pulv. Opii, . . . . . . . | gr. ij or iij. |
| Ext. Colocynth Comp., . . . . | gr. xij to xviij. |

Ft. mas. et div. in pil. No. xxiv.

S.—One every three or four hours until free action of the bowels is secured.

*Enemata.*—The action of these laxatives may be furthered by the administration of large enemata, which may consist either entirely of

tepid water, or of water containing a small proportion of some stimu
ing or laxative substance, such as soap, molasses, or castor oil. In ca
where the irritability of the stomach precludes the administration of la
tives by the mouth, enemata become especially important, and at ti
their use will be followed by the most happy results, the irritating c
tents of the cœcum being brought away with almost immediate relie
the most threatening symptoms.

*Mercury.*—It is difficult to support the practice of giving this dru
typhlitis. In the early stage, indeed, when it may be supposed that
intestinal canal contains irritating ingesta and secretions, a small d
of calomel or blue pill may be administered; and, in a large numbe
the successful cases on record, this was done. It is not, however, at
necessary. Beyond this, the further use of mercury appears to us inj
ous, since, if it be given until any constitutional effects are produce
must have a tendency to prevent the formation of those strong adhesi
which constitute the sole chance of recovery in case of perforation of
appendix or the anterior wall of the cœcum.

*Opium.*—We have already mentioned the way in which opium is m
advantageously given in this affection, in combination with the laxa
employed. Its use is absolutely called for, and the violence of the lo
symptoms, the pain and exquisite tenderness, form the best guide a
the amount required.

*Poultices and Counterirritants.*—In case even the local abstractio
blood appears undesirable, resort should be had to the frequent appl
tion of mustard plasters or turpentine stupes to the cœcal region. I
fomentations or light poultices, to which some sedative substance may
added, should be kept constantly applied to the abdomen.

*Vomiting* when present, should be allayed by counterirritation,
swallowing small fragments of ice, by carbonated drinks, hydrocy
acid, or any other suitable remedy.

The diet during the early stage should be fluid, and unirritating
character.

When the persistence of the symptoms leads us to apprehend the p
ence of ulceration, either of the cœcum or appendix, all depletory
perturbating treatment should be abandoned, and we should limit
efforts to the relief of pain, by the use of opium and the continued ap
cation of poultices; to regulating the functions of the intestinal ca
and to the sustentation of our patient's strength.

If perforation has occurred, without the speedy development of gen
peritonitis, our attention should be mainly directed to supporting
system during the long and exhausting process of suppuration wh
must ensue. For this purpose a generous, though digestible diet,
as much stimulus as appears necessary, should be enjoined; and re
may also be had to the various tonics, as quinia and the preparation
bark. If a tumor forms, and it becomes evident that the abscess is te
ing to discharge externally, its approach to the surface should be
couraged by poulticing; and the moment an emphysematous condit
of the skin is detected at any point, a free incision should be made,

the discharge of matter furthered by the introduction of a sponge tent or a pledget of lint, and the application of a poultice.

In those unfortunate cases where the perforation of the bowel has been followed by general peritonitis, all treatment is unavailing. Our main reliance must, however, be placed upon the exhibition of opium, and the use of counter-irritation.

## ARTICLE VI.

### INTUSSUSCEPTION.

DEFINITION; SYNONYMES; FORM; FREQUENCY.—Obstruction of the intestinal canal, from one or another of the numerous causes capable of producing it, is an accident liable to occur at all periods of life. But the variety of it which forms the subject of this article is of rare occurrence excepting in early childhood. It has been called ileus, volvulus, miserere mei; but is best known under the descriptive names of intussusception or invagination of the intestines. It consists in the passage or introduction of one portion of intestine within another, as a small tube might slide into a large one, or, to borrow a familiar illustration, as the end of a glove finger may be pushed back upon itself into the glove. This simple invagination, however, is not the only element present, for in order that the symptoms of intussusception should be produced, it is necessary that the included portion of bowel should be so incarcerated and constricted as to give rise to more or less complete intestinal obstruction. This has led to a very just division of intussusceptions into such as are slight, unattended by inflammation, or spasmodic; and such as are grave, or attended by inflammation and incarceration. The slight form of invagination is found very frequently at autopsies of children who have died of other diseases, and in whom during life there was no symptom of disturbed function of the alimentary canal: it is in all probability produced in the death agony.

M. Louis states that the greater part of 300 children dying during the period of dentition at the Salpétrière, had 2, 3 or even 4 volvuli without inflammation.

Baillie, Cheyne, and Billard speak of such intussusceptions as being frequently found at the autopsies of children; and Burns, as quoted by Gorham,[1] gives the results of the autopsies of 50 children who had died from diarrhœa, in every one of which they were found. This species of invagination in children occurs almost exclusively in the small intestine; the invaginated part is usually of no considerable length; and the very slightest traction suffices to restore it.

The grave form, on the other hand, differs from this alike in the very positive symptoms by which its presence is announced, in the condition of the parts involved, and in the part of the bowel affected; and as the

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[1] Guy's Hosp. Reports, 1st series, vol. iii, 1888, p. 880.

and that the period of greatest frequency is from the third to the si
month of life, the maximum number being at the fourth month." Th
there were 11, of the 50 cases collected by him, at the age of 4 mont
or 21 in all between 3 and 6 months inclusive; 8 from 6 months to 1 yea
and only 18 between the ages of 1 and 12 years.

We must, however, call attention to the rarity of this disease at any a
among us; for although, in the course of a very extensive practice amo
children in this city, we have met with several well-marked illustratio
of the various forms and terminations of intussusception, it has been o
of the rarest occurrences in our experience.

Anatomical Appearances.—Intussusceptions, anatomically consi
ered, may be divided into descending or progressive, and ascending
retrograde, according to the direction which the invaginated porti
takes; and into central or lateral, according as the entire intestine,
but one wall, is invaginated. Lateral invaginations, however, are excee
ingly rare, occurring but twice in 137 cases collected by Duchaussoy.

Excepting when invagination occurs as a complication of some oth
affection, it is almost invariably of the descending form. Thus, of D
chaussoy's 137 cases, only 16 were retrograde, all of them being compl
cated; and Haven gives but 3 instances of ascending intussusception o
of 59 cases.

It is a matter of considerable importance to determine what is the mo
frequent seat of intussusception in children. Rilliet and Barthez[2] decla
that in infants the small intestine is almost never the seat of intussusce
tion, but that ordinarily it is the lower end of the ileum which is invag
nated into the large intestine. The reasons for this are found in th
anatomical conditions of the intestines in infancy: the adhesions of th
cœcum to the right iliac fossa being much more limited and less powerf
than in later life; and the muscular coat of the cœcum being but slightl
developed in childhood, a circumstance which must also tend to favor th

states that he has found no exception to Rilliet's remark, as regards early infancy. In children above the age of 2 years, fatal invagination in the small intestines may occur in rare cases. In a few cases also, the ileum has preserved its normal relations to the ileo-cœcal valve, the cœcum being the first part inverted, and drawing after it the lower end of the ileum.

An intussusception, then, is made up of three folds of intestine: 1st, The inner, or contained part, which in descending intussusceptions is always in the natural direction; 2d, The middle, which is a reflection of the inner, and passes in a direction contrary to the intussusception; and 3d, The outer, containing part or sheath, which is in its natural position, and in the direction of the intussusception. We find, therefore, the mucous membrane of the middle and outer parts in apposition; and the peritoneal investment of the middle and inner parts in contact.

The amount of intestine invaginated and the condition of the parts depend, in great measure, upon the duration of the case. If death takes place early, only a small portion of the ileum may have passed the valve; but as the case progresses, the tenesmus or the active peristaltic action of the outer part, brings down more and more of the ileum with its accompanying mesentery, until finally, the constriction of the ileo-cœcal valve preventing the descent of any more of the ileum, the cœcum is inverted and forced into the ascending colon. This in turn may be invaginated in the descending colon and rectum, until not unfrequently a portion of the invaginated intestine protrudes from the anus. In rare cases, the whole invaginated mass descends into the intestine below, thus forming a double intussussception of great thickness. It has occurred, in a few rare cases, that the amount of constriction was so slight that the intestine remains pervious to a certain extent; so that life has been protracted for many weeks, and death has finally ensued only from exhaustion. But ordinarily the parts are in the following condition: the intestine above the point of constriction is distended with gaseous and fecal contents, and more or less discolored from congestion of its walls. It is rare, however, to find any evidences of enteritis either here or in the intestine below the intussusception, which is generally pale and contracted. The invaginated portion itself, at the upper part, where it seems to plunge into the containing portion of the intestine, presents a series of concentric circular folds. The walls of the bowel thus incarcerated are thickened and infiltrated; their serous investment either deeply injected or discolored by congestion and ecchymosis, so as to be of a deep blackish-red color; and frequently evidences of local peritonitis are present. The mucous membrane in cases of short duration may be merely thickened and injected, but more frequently it is turgid from congestion, ecchymosed in points, and shows the effects of violent inflammation by its unequal roughened surface, presenting either ulcerations or grayish false membranes. The capillaries of the constricted portion become greatly distended, so that, especially in young children, in whom the vascular rete of the intestines is remarkably rich, whilst the tissues are delicate and yielding, they frequently rupture, filling the invaginated intestine with blood, and producing bloody discharges.

If the case is protracted and the powers of life sufficient, when treatment has not sufficed to reduce the intussusception, nature endeavors to effect a cure by eliminating the invaginated portion. The incarcerated bowel becomes gangrenous, a line of separation forms, union and cicatrization takes place between the part of the bowel above the intussusception and the upper part of the containing intestine, and the invaginated portion is discharged per anum. This process of elimination is extremely rare in infants; but it is stated by Rilliet to be the ordinary method of cure in children in their second infancy. In 59 cases reported by Haven[1] of all ages, discharge of the intestine per anum took place 12 times, with recovery in all but two cases. The average length of intestine passed in these cases was 23½ inches; in the two fatal cases, the portions passed were respectively 39 and 44 inches long. The earliest age at which we have met with this process of cure, is at 13 months in a case reported by M. Marage.

In the report of the *Proceedings of the Pathological Society of London*, vol. xiii, a specimen is described by Dr. Hare, where this process had taken place. The patient was a female, 41 years of age, and her death resulted from tubercular disease three months subsequently to the passage of the sphacelated bowel, "which was 6½ inches in length, of a very dark purplish-gray color: it formed a perfect cylinder, but the intestine was turned inside out, the exterior of the specimen, as voided, being the mucous membrane, and the interior of the cylinder being the peritoneal covering of the intestine."

At the autopsy, at the point where the invaginated portion had been separated, about fifteen inches above the cœcum, the line of union was found running obliquely across the intestine, "but the union was so perfect that it could scarcely be detected except by holding up the intestine between the eye and the light, when the thinness of the intestine clearly pointed out the line or seam where the union had taken place. Exactly at the point of union the intestine was notably narrower than natural; but the intestine above this point was a little dilated."

We have recently had an opportunity, through the courtesy of Prof. A. Stillé, of studying a specimen in which a similar process of cure had been effected. The patient was an adult, who died of some chronic disease, and no history could be obtained of the occurrence of the attack of intestinal obstruction, or of the discharge of the sphacelated portion of bowel from the anus. The specimen, however, presented appearances which left no doubt that invagination of a portion of the ileum had occurred, that the invaginated portion had sloughed away, and that union had taken place between the intestine, just above the intussusception, and the upper part of the sheath, so as to preserve the continuity of the bowel. The external surface presented a marked constriction encircling the intestine, due to the entrance of the upper part of the bowel into the sheath. There was a layer of organized lymph investing the peritoneum at the line of junction, and firmly uniting the two serous surfaces. Upon laying open this part of the ileum, a narrow rim of indurated tissue, evidently the altered intestinal wall, projected downwards into the intestine from the line of constriction, and formed, as it were, a perforated diaphragm across the calibre of the bowel.

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[1] Haven on Intestinal Obstruction, Amer. Jour. Med. Sci., vol. xxx, 1855, p. [illegible]

We thus see that even when the slough is cast off, and the patient recovers from the intussusception, the cure is not always permanent, since in a small proportion of cases there may be serious contraction of the bowel, caused by the ensuing cicatrization.

In addition to the modes of recovery already adverted to, namely, the reduction of the intussusception either by the movements of the bowel itself or by the remedial measures adopted, and the elimination of the invaginated portion, there is still a third mode possible, in which the intestine remains invaginated, but by agglutination of the outer folds, becomes pervious, and undergoes such atrophy and contraction as not to interfere materially with the functions of the bowel. Rilliet and Barthez, as well as other Continental authors, speak of this as of occasional occurrence, but we have not found any well-authenticated cases recorded.

There are few morbid changes found in intussusception excepting those pertaining to the intestines. It is, however, worthy of mention, that in some cases the invaginated mass appears to produce serious compression of the large vessels of the abdomen.

CAUSES; *Age.*—We have already given the statistics which prove that intussusception is relatively very much more frequent during the first four years of life, the period of maximum frequency being between the third and sixth months. It is very rare before the age of three months. All forms of invagination, however, do not occur with equal frequency at these various ages. During early infancy, for the anatomical reasons already assigned, the almost invariable seat of the invagination is the lower end of the ileum and the upper part of the large intestine; while, after the age of two years, invaginations of the small intestine alone, though still very rare, may occur.

*Sex.*—All statistics agree in giving a majority of males over females, at least in the proportion of 2 to 1; while in some tables the proportion is as high as 7 to 1; thus Rilliet and Barthez collected 25 cases, of which 22 were boys.

*Previous Condition.*—In by far the majority of cases, intussusception in the infant occurs as an idiopathic affection, appearing during perfect health. In children over one or two years of age, however, it is much more apt to be preceded by some disturbance of the alimentary canal, as constipation, diarrhœa, dysentery, or even by symptoms of imperfect obstruction of the intestines.

Intussusception may also occur during the course of other diseases, as in a case quoted by Rilliet from Legoupil, where the invagination appeared during the progress of variola; the child, 4½ years old, recovered.

*Exciting Causes.—External violence*, as blows upon the abdomen, or sudden jerking of the child's body, as in tossing it in the arms, are assigned as the probable exciting cause of a certain number of cases. It has been supposed, also, that violent fits of coughing or screaming, or strong straining at stool, have produced invaginations, especially in very young children.

Improper alimentation and sudden changes of diet, appear to act quite frequently as efficient causes; thus in a case reported by Gorham, occurring in a healthy infant of four months old, the only assignable cause was the administration of panada for three days preceding the attack. It is, however, frequently impossible to assign any plausible reason for the sudden production of severe intussusceptions.

Granting, however, the presence of any of these causes, the question still remains as to the exact mechanism of the invagination. According to Gorham, "it is necessary to the production of an intussusception that there should be either; 1st, A contraction of the part to be intussuscepted; or 2d, A dilatation of that part which is to be the outer fold; or 3d, A natural and sudden inequality of calibre of some portion of the intestinal tube. The first of these conditions may be produced by spasm; the second by flatus; whilst the third is always present at the termination of the ileum in the cœcum." It is at this point, accordingly, that intussusception most frequently occurs, and, from the anatomical arrangement of the parts making it very difficult for restitution to occur, puts on its most dangerous and fatal characters.

The invagination having once begun, its increase and persistence are probably due to the active peristaltic action of the outer fold, aided by the spasmodic contractions of the diaphragm and abdominal muscles, causing the powerful tenesmus so frequently observed.

There is one more question in regard to the etiology of this affection, about which various opinions have been expressed; whether, namely, enteritis holds the relation of cause or effect to intussusception. Rilliet and Barthez appear to us to have given it its true importance in stating that it sometimes plays one part and sometimes the other. We have already seen that, though in many cases intussusception occurs suddenly in full health, there are a sufficient number of instances where the attack has been preceded by symptoms of intestinal irritation or inflammation, to make it clear that at times enteritis acts as a predisposing or determining cause. And, on the other hand, the pathological anatomy of the disease, showing the inflammation of the bowel to be limited to the immediate vicinity of the invagination, and to be the more intense as the constriction is tighter, proves that enteritis frequently appears as a result of intussusception. This becomes especially evident in those cases where the disease has been caused by external violence, and where after death the above conditions have been noticed.

SYMPTOMS; DURATION; TERMINATIONS.—The principal symptoms of intussusception are furnished by the gastro-intestinal apparatus; and, towards the termination of unfavorable cases, by the nervous system. We have seen that a considerable difference exists in the seat of the invagination at different periods of childhood, and in examining the symptoms we find a corresponding disparity, according as the intussusception occurs in the first infancy, under the age of 2 years, or in the second infancy, between the second and sixth year. These points of difference will be mentioned, as each symptom is discussed.

The most important and characteristic symptoms are: vomiting, constipation, and bloody discharge from the anus; abdominal pain, tenesmus, and protrusion of the intestine, the presence of a tumor in the abdomen, and tympany.

*Vomiting* is an almost constant symptom; being present in about 95 per cent. of the cases. Very rarely the gastric disturbance amounts only to nausea, but nearly always vomiting sets in early in the attack and persists, despite all treatment, until either the invagination is relieved, when it promptly ceases; or until the approach of death. Quite frequently it ceases a day or two before the fatal event occurs. The matters vomited at first consist of the ingesta, the stomach rejecting everything taken into it; soon, however, they become mixed with mucus and bile. In very young children, it is rare for stercoraceous vomiting to occur, but in those who are above two years of age it may occasionally be present. In Smith's 50 cases, it occurred in three, at the respective ages of 3, 6, and 11 years.

The condition of the bowels is generally one of obstinate *constipation*, so far as the passage of fecal matters is concerned. It is not unusual for one natural abundant stool to occur after the intussusception begins, but this is succeeded by constipation. It is only in those very rare cases where the invaginated portion remains pervious, that a small amount of fecal matters finds its way into the stools.

The discharges which, however, do take place almost invariably in intussusception in children, are due to the rupture of the capillaries of the constricted bowel, and consist of blood mixed in varying proportions with mucus and serum. It is rare for the blood to be so deficient, that the discharges resemble the gelatinoid mucous discharges of dysentery, merely streaked and tinged with blood, whilst, at times, the blood is in such excess as to appear pure, and to constitute a true intestinal hemorrhage. This symptom, the true value of which was first recognized by Gorham and Clarke,[1] is of more uniform occurrence in children under two years, on account of the greater ease with which the intestinal capillaries give way in infancy. Thus of 26 children under one year of age, bloody evacuations occurred in 23, usually several times in the twenty-four hours; in 2 of the 26 there is no record of this symptom, and in 1 only is it recorded as absent. In case No. 2, of Mr. Gorham's table, a child of 3½ months passed within a few hours more than a teacupful of fluid blood. In older children, on the other hand, bloody discharges occur less frequently; thus Smith records 18 cases of invagination between one and two years, in only 6 of which it is stated that there were bloody motions.

We have already mentioned the various ways in which recovery takes place, and when elimination of the invaginated portion is about to occur, which is almost exclusively limited to cases occurring in the second infancy, the stools become highly fetid, contain more or less blood, are blackish or brownish in color, and are soon accompanied by the discharge of the slough. The interval elapsing between the inception of the attack and the discharge of the portion of bowel, varies considerably in different cases, but seems to be less in childhood than in adult age. Thomson states that in adults, the elimination takes place in the majority of cases within thirty days; and in one of his cases it occurred as early as the sixth day. In children the interval rarely exceeds twelve days; and the average of all recorded observations would seem to fix about nine days as the usual time.

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[1] London Lancet, January, 1838.

*Abdominal pain* is among the earliest and most constant symptoms at all ages. During the early part of the attack, it appears in paroxysms; and may be detected even in the youngest children, by the violent paroxysmal screaming, and contortions of the limbs and trunk. At the commencement, the abdomen is generally relaxed, supple, and indolent: and this condition may remain until death, perhaps because the constriction in some cases is not complete and allows the passage of gas. But after a few days, there is apt to be more or less continuous pain and soreness on pressure in the part of the abdomen corresponding to the invagination, due to the local enteritis and peritonitis. This may or may not be accompanied by tympany and diffuse tenderness of the abdomen; but, as a general rule, intussusception in very young children is not attended by the great distension and marked symptoms of general peritonitis which frequently appear in intestinal obstruction in adults. In children over two years of age, the abdominal symptoms are more apt to indicate peritonitis. In a considerable proportion of cases, tenesmus occurs and adds much to the suffering. It does not appear so early as the abdominal pain, and generally ceases a few days before death.

*Tumor.*—It would appear natural that when a considerable intussusception has taken place, the knot formed at the point of obstruction should be readily detected through the abdominal walls. And yet the cases on record show that this tumor is recognizable in not more than two or three out of every ten cases. When it can be detected, it is generally found in the left iliac region, varying in size from a walnut to a large goose-egg, and giving the sensation of a solid, but doughy and compressible mass. It is ordinarily quite movable, and percussion elicits a dull note over its position.

Another symptom depending upon the displacement of the intestine, to which considerable importance has been attached in the diagnosis of invagination in the adult, is a depression of the abdomen at a point corresponding to the displaced intestine, and a fulness at the corresponding point on the opposite side. Experience has shown, however, that but little value can be attached to this sign in young children, on account of its great rarity.

We have seen that the presence of a tumor in the abdomen is far from an invariable sign of intussusception, and the same remark applies to the *protrusion of the invaginated bowel from the anus*, a symptom to which very different diagnostic value has been attached by different authors. It is stated by some to be almost never present, but we have found it recorded particularly in six of Smith's cases, the same number in which an abdominal tumor was present in the same series; and in three other cases, although no tumor protruded from the anus, the invaginated mass was readily felt by examination per rectum.

When the bowel protrudes, it forms an oblong tumor, at times even two inches in length, much congested from the constriction, and smeared with blood and mucus.

When we pass from these positively diagnostic symptoms, we find little elsewhere characteristic of the disease. The tongue is normal until inflammatory action sets in, when it often becomes dry and brown; the appetite is impaired or absent, and the thirst is generally but moderate. Rilliet and Barthez call attention to the importance of this last symptom in a diagnostic point of view, as well as to the fact that the emaciation is usually not so marked as in other acute diseases of equal duration and severity.

The amount of febrile action is generally slight in infancy; the surface, cool at first, may at times become hot, or is alternately hot and cold, and as death approaches remains continuously cold. The pulse soon becomes frequent, though small and feeble. There is no marked disturbance of respiration.

In older children there is apt to be more febrile action, the skin being hot until late in the attack, and the pulse frequent and more full. The physiognomy of the little patient is greatly altered from the commencement of the attack. The eyes are dull and languid, sunken in their orbits, and surrounded by discolored areolæ; the countenance is expressive of the most profound prostration, so as to have elicited a comparison to the physiognomy of cholera patients.

Almost all cases, at whatever age, present symptoms of marked disturbance of the nervous system, as great restlessness, indescribable malaise, sharp cries, and, toward the close of the case, profound prostration. But in infancy, in addition to these symptoms, the case is more apt to present an attack of convulsions, either as one of the earliest symptoms, or toward death, alternating with coma.

*Duration.*—It is necessary to distinguish here between cases occurring during extreme infancy, when we cannot hope for elimination to take place, and those in more advanced childhood. In early infancy, when the attack is about to take a favorable turn, the symptoms usually yield in from two to four days, owing to reduction of the invagination. In fatal cases, death occurs within five days, as the rule. In some cases, however, where the constriction was not complete, life has been prolonged even for six weeks.

In second infancy, where the constriction is complete, and the result fatal, death occurs within seven or eight days in the vast majority of cases. But when elimination is to result, the case is more protracted, and complete recovery is postponed to the third week. Thus, in 7 cases out of Smith's statistics, which resulted favorably by sloughing, the ages were 5, 6, 6, 9, 11, 12, and 12 years respectively; and the separation of the invaginated portion took place between the ninth and twelfth days, mination, namely, by the subsidence of the intussusception, either s taneously or as the result of treatment; by restoration of the calib the bowel by sloughing of the invaginated bowel, and union and cicat tion of the divided edges; and finally, by agglutination of the o layers of the invaginated portion with subsequent thinning and atro thus rendering the intestine pervious, although the intussusception mains.

In those cases in which death takes place very early, as on the fir second day, it is frequently produced by cerebral congestion or an at of convulsions. In the majority of cases, however, it occurs some later, and is preceded by a state of collapse. Even in those cases w the constriction is not at first complete, and where there are daily f lent evacuations for a time, death is apt to occur from exhaustion from the invagination becoming more extensive and symptoms of c plete obstruction arising.

PROGNOSIS.—A single glance at the character of the lesion and the companying phenomena, suffices to assure us of the grave nature of in susception, and of the impotence of all ordinary methods of treatm against it. In young infants, indeed, where the strength of the sys cannot be expected to hold out until elimination occurs, intussuscep is almost invariably fatal. In a single instance only has recovery elimination been noticed so early as the end of the first year. In a cases, where the symptoms were well developed and threatening, t have subsided and the infant has recovered, apparently from spontane reduction of the invagination.

We must not, however, forget that during the early stage of this af tion the diagnosis is somewhat doubtful, since young children frequen present symptoms of obstructed and loaded intestine, such as a distend hard abdomen, constant unnatural straining, with evident suffering, a yet are entirely relieved after the administration and operation of la tives.

Even after elimination has taken place, however, the prognosis should still be somewhat guarded, as the slightest indiscretion in diet may, either by the development of flatulence or by the escape of irritating, undigested particles into the intestine, cause a rupture of the recently formed cicatrix and speedy death.

Diagnosis.—Intussusception has been, until recently, regarded by all authors as an affection of obscure and doubtful diagnosis. With the light, however, which has been thrown upon this subject by the labors of Clarke, Gorham, Smith, and especially Rilliet, the diagnosis in the great majority of cases can be made with precision. It is true, however, as conceded by Rilliet, that "very rarely in early infancy, more frequently than later, there are certain cases of invagination impossible to distinguish from other forms of intestinal obstruction; and that at all periods of childhood the diagnosis presents many difficulties."

With what diseases, then, could we confound this affection, occurring, as we have seen, suddenly in perfect health; attended by obstinate, though rarely fecal vomiting; by marked constipation, but with frequent bloody discharges; by paroxysmal abdominal pain and tenesmus; by the presence of a tumor, generally in the left iliac region; by the protrusion of the invaginated bowel from the anus; and by profound prostration and disturbance of the nervous system. It is to be remembered, indeed, that this group of symptoms, so characteristic when viewed together, are rarely all present; and that, with the exception of the vomiting, constipation, and bloody discharges, there is no single symptom which is not more frequently absent than present. There are, nevertheless, a sufficient number present in nearly every case to enable us to form a diagnosis.

The diseases which may most readily be confounded with intussusception are, 1st, impaction of the intestine with hardened fæces; 2d, typhlitis or perityphlitis; 3d, cholera infantum; 4th, dysentery; 5th, intestinal hemorrhage; 6th, the various forms of internal strangulation; 7th, peritonitis.

1st. When an accumulation of fecal matter takes place in either the cœcum or sigmoid flexure, the case may present many symptoms similar to those of intussusception. There is frequently such gastric and intestinal irritation, as to lead to occasional vomiting and paroxysmal abdominal pain; the bowels are constipated, and there is frequent and strong tenesmus, so as often to cause protrusion of the bowel. In addition to these symptoms, a well-defined tumor is present in one or the other iliac fossa.

These cases, however, often have presented symptoms of intestinal disturbance for some time previous to the attack; the vomiting is rarely so constant as in intussusception; the tumor is quite painless and has a peculiar doughy consistence; bloody discharges from the bowels are very rare; and we do not notice the profound prostration which exists in well-established invagination. During the early stage of the case, however, the diagnosis is doubtful; and when we have reason to suspect the presence of fecal accumulations, we must await the result of the administration of laxatives and laxative enemata, before deciding upon the nature of the case.

2d. Inflammation of the cœcum, appendix vermiformis, or of the pericœcal connective tissue, is attended with fulness or a well-defined tumor in the right iliac fossa, with vomiting, constipation, and occasionally tenesmus, with distension of the abdomen and pain radiating from the right iliac region.

There is, however, a marked degree of fever, and the symptoms of local peritonitis appear early in the case; the patient assumes a characteristic position, with the thighs flexed upon the pelvis, and the right iliac fossa is the seat of exquisite tenderness, so that the slightest pressure cannot be tolerated. The vomiting and constipation are not so marked and obstinate, and excepting in those cases which have been preceded by dysenteric symptoms, there are no bloody discharges, and, as we have remarked above, the tumor or fulness is in the right iliac fossa; whereas, when this sign is present in intussusception, it usually occupies the left iliac region.

3d. In cholera infantum, the vomiting is often incessant; the stools are frequent, with painful tenesmus; the abdominal pain paroxysmal, and occasionally the intestine protrudes from the anus. It is almost impossible, however, to mistake this affection for intussusception, if we remember that it is almost always accompanied by fever, with insatiate thirst, and prompt and extreme emaciation; that the abdomen is without tumor, and rarely distended until towards the close of the case, and that the stools, instead of being bloody, are large and fluid.

4th. Dysentery frequently offers a close resemblance to intussusception so far as the characters of the stools are concerned, as they are often small and bloody, or muco-sanguinolent. But we do not see in dysentery the sudden inception, the rapid progress, the obstinate vomiting, the moist tongue and moderate thirst, which characterize intussusception.

5th. We have seen that occasionally the amount of blood passed by stool in intussusception is very great, and constitutes a true intestinal hemorrhage; thus in the case reported by Marwick,[1] it amounted to a large teacupful of pure blood.

Intestinal hemorrhage is a very rare occurrence during childhood, but has been noticed in children in connection with polypus of the rectum, especially by Mr. Bryant; in typhoid fever, or the hemorrhagic form of some others of the exanthemata, and in the course of purpura. The absence of the other symptoms of intussusception, however, and the presence of the local or general symptoms peculiar to these various conditions, will serve to render the diagnosis easy.

6th. Other forms of internal strangulation, such as those produced by a diverticulum from the intestine compressing it, by the adhesion of the vermiform appendix so as to constrict the bowel, or by a contraction of the calibre of the bowel, produce symptoms so identical with those of intussusception in second infancy, when the affection more nearly resembles intestinal obstruction in the adult, as to render diagnosis impossible. The presence of an abdominal tumor, the occurrence of bloody stools, or the protrusion of the constricted bowel from the anus, would be the only diagnostic signs.

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[1] London Lancet, July, 1846.

7th. Peritonitis, when diffuse, presents a few symptoms in common with intussusception; as the vomiting, constipation, abdominal pain and tenderness; and when the inflammation of the peritoneum is localized, there is in addition a well-defined sensitive tumor, which soon appears as the result of the inflammatory action. The diagnosis here rests upon the greater frequency of the vomiting in intussusception, the more obstinate constipation with bloody discharges from the bowels; the paroxysmal nature of the abdominal pain, with less tenderness; the less degree of fever, the moist tongue, slight thirst, quiet respiration, and only moderately accelerated pulse.

TREATMENT.—There is no special plan of treatment for intussusception deserving the name of *preventive*, owing to our ignorance of any symptoms which can be definitely regarded as the precursors of the invagination. The fact, however, that various derangements of digestion, such as pain upon going to stool, diarrhœa, or constipation alternating with diarrhœa, have been occasionally noticed to precede the attack, should be an additional motive to urge us to meet these symptoms by the most assiduous attention to the hygiene of the child, and to the regulation of its alimentary functions.

The *curative* treatment may be divided into three classes: the medical, mechanical, and surgical treatment.

*Medical.*—*Depletion* is strongly contraindicated by the tender age of the patients, and by the necessity of preserving the vital powers; since elimination, which affords the principal chance of recovery, does not occur until after the eighth day. In order, however, to relieve the engorgement at the point of constriction, without reducing the strength of the patient, it is advisable to apply a few leeches or cups to the abdomen, and preferably to the right iliac region, unless a tumor can be detected, when, of course, they should be applied over its seat.

*Purgatives* were formerly strongly advocated by most authors; the one most generally advised being quicksilver, which was given with a view of overcoming the obstruction by its great weight and fluidity. The use of this agent is now, however, universally reprobated.

In regard to other and less mechanical purgatives, there is still some difference of opinion.

During the early stage of the attack, before the symptoms of intussusception are very positively developed, we should advise the administration of a mild but thorough laxative, such as castor oil, in conjunction with large laxative enemata. If, however, at the end of twenty-four or forty-eight hours, the administration of these remedies, aided by the local depletion, has failed to produce an evacuation from the upper bowel, these measures should be abandoned, and recourse be had to means of calming pain and nervous disturbance, and to the sustentation of our patient. Among the remedies best calculated to allay the pain, the tenesmus and the nervous irritability are: opium, in doses proportionate to the intensity of the pain; warm anodyne poultices applied to the abdomen, and warm baths carefully given. These latter are especially serviceable when the symptoms of nervous disturbance are marked, even amounting, as they occasionally do, to general convulsions.

In endeavoring to sustain the child's strength, attention must be paid to the vomiting, which is generally so severe as to prevent any nourishment being retained. The remedies of most service against this are counter-irritants to the epigastrium, opium, hydrocyanic acid, small pieces of ice kept constantly in the mouth or swallowed whole.

Nutritious enemata may also be tried, but are rarely retained.

The *mechanical* treatment consists in the injection of fluids or air into the bowel in such quantities as to distend it, and in the introduction of a large sound, with the view of pushing up the invaginated portion of intestine. The fluids generally used have been either tepid water or warm gruel, injected forcibly into the bowel, until the sudden cessation of resistance informs us of the reduction of the intestine. We have already seen that the seat of intussusception in the child is almost invariably the lower end of the ileum, which passes into the cœcum and is there constricted; and, when we reflect that it has been frequently demonstrated that if fluid be forcibly injected into the large bowel, the ileo-cœcal valve will rupture before any fluid is allowed to pass into the ileum, it is evident that we can in this way exert a most powerful pressure upon the invaginated intestine. Experience shows that this procedure is frequently successful, even in cases where all medicinal treatment has proved unavailing; and there are now a sufficient number of such cases on record, to render a resort to it proper.

*Air*, however, both on account of its greater elasticity and mobility, as well as the greater facility for its introduction in sufficient quantity, is to be even more highly recommended. Indeed, inflation was advised by Hippocrates as a remedy in intussusception, but until within the past forty years does not seem to have been much practised. Two cases of obstruction of the bowels, occurring in adults, successfully treated by inflation, are reported in the *American Journal of Medical Sciences*, for 1833: one by Dr. Janeway, of New York; the other, which, however, was transcribed from the *Glasgow Medical Journal* for 1831, by Dr. King. The following year, in the *Boston Medical and Surgical Journal*, December 15th, 1834, Dr. J. Wood published a case, also in an adult, where death seemed imminent, but where the obstruction was readily overcome by inflation, and the patient recovered. Since then, this remedy has been frequently employed in intussusception in children, and with such good results that it may fairly be said that the prognosis of this affection is less grave since the introduction of this remedial measure. To obtain the best results, inflation should be employed early in the case, before any considerable amount of adhesive inflammation has taken place between the sheath and the contained intestine. The air is readily introduced by a pair of ordinary bellows; the nozzle being inserted well into the rectum, and inflation continued until the obstruction yields. The return of the invaginated intestine is sometimes attended by a clearly audible sound, a species of crack, but it never gives any pain, and has generally seemed to afford relief. The complete restoration of the calibre of the intestine is proved by the copious feculent stools which frequently come away soon after the inflation.

A third mechanical means for restoring the displaced intestine has been recommended by Dr. Nissen, and consists in pushing up the invaginated portion by means of a œsophageal sound protected by a sponge. This proceeding would probably be readily accomplished, if the intussusception occurred far down in the large intestine; but it would appear very difficult to replace an invagination as high as the ileo-cœcal valve. Dr. Nissen, however (in the *Journal de Constatt*, quoted by Rilliet and Barthez), gives two cases in which he succeeded in pushing up the intestine into the ascending colon, with complete relief of the symptoms of obstruction. There are also a few other cases of cure, by this means, upon record in medical literature.

The *surgical* treatment consists in the performance of the operation of gastrotomy, finding the invaginated portion of bowel and reducing it by gentle traction. Opinions differ greatly as to the propriety of this operation in intussusception. The majority of authors, especially the English and American ones, however, seem to condemn it. They base their unfavorable opinion upon the grounds of the great difficulty of ascertaining the exact position of the intussusception; the difficulty of restoring the invaginated intestine even if found; and finally upon the dangers of the operation.

We have seen, however, that in the majority of cases the invaginated mass will be found in the neighborhood of the left iliac fossa; the lower end of the ileum having traversed the cœcum, ascending and transverse colon, and these parts being successively inverted; that in a certain proportion of cases a tumor is readily detectible; and further, that some idea as to the seat of obstruction may be obtained from the distance to which enemata appear to penetrate. So that in a considerable proportion of the cases, we have the means of localizing the point of constriction, with a certain amount of definiteness.

In regard to the difficulty of reducing the invaginated parts, authors differ greatly. It has been remarked, that even if the equivocal and uncertain nature of the symptoms of volvulus were not sufficient to deter us from undertaking the operation, the state of the invaginated parts would entirely banish all thoughts of such an imprudent attempt; since the different folds of intestine become so agglutinated to each other that they can hardly be withdrawn, even after death.

Rilliet and Barthez (*loc. cit.*), however, conclude from their anatomical researches, that in the majority of cases the disengagement of the intestines is very easily accomplished; and accordingly they declare that, "after employing medical treatment during three or four days, and after having made several attempts at inflation, we should not hesitate to perform gastrotomy."

The great danger of the operation is, of course, apparent, but should hardly be considered an objection, when we consider the fatal nature of this affection. Nor have the results of operation been such as to destroy hope; for in addition to several successful operations previously recorded, the only 3 cases of the 57 collected by Haven, in which gastrotomy was performed, terminated favorably.

To sum up our remarks upon this subject: after having tried for two or three days the medical and mechanical means recommended, without success, we must forbear and decide whether to trust the case to nature, with the hope of elimination of the invaginated bowel occurring, or to resort to gastrotomy. And in this decision, the circumstances of each case must be taken into account; for if the case has not yet progressed so far that adhesive inflammation has certainly taken place, and if we are able to detect the exact seat of constriction by the presence of a tumor, the operation certainly has strong arguments in its favor, and should not be hastily rejected.

In those cases which have been trusted to nature, and when elimination has fortunately occurred, we must treat the child, during this crisis, with the utmost care. The diet must be rigidly regulated, and the child kept in absolute repose. Nor must we relax these precautions for several weeks, and allow either indigestible food, or too large a meal of even the most digestible articles; since death has been several times known to follow this imprudence, from a rupture of the imperfectly formed cicatrix.

# CLASS IV.

## DISEASES OF THE NERVOUS SYSTEM.

### GENERAL REMARKS.

It is a very common opinion, both in and out of the medical profession, that this class of diseases occasions a much larger number of deaths in childhood than any other. Indeed, many persons suppose that, be the primary disease what it may, nearly all children who die, die as it is said by the brain. It appears, however, from an examination of the bills of mortality for this city, that this opinion is not well founded. During the five years from 1844 to 1848 inclusive, the number of deaths from diseases of the nervous system was less than from diseases of the digestive system, and though larger than those from diseases of the respiratory organs, not so much so as the popular notion would seem to warrant. The number of deaths from diseases of the nervous system was 3970; from diseases of the digestive system, 4204; and from affections of the respiratory system, 3376. M. Barrier, whose observations were made at the Children's Hospital in Paris, says (*loc. cit.*, t. i, p. 35) that, setting aside cases in which the nervous symptoms were probably only sympathetic of some other coincident disease, the cerebro-spinal affections were few in number in comparison with those of the thorax, abdomen, and senses, including amongst the latter the eruptive fevers. He states (*loc. cit.*, p. 34) that affections of the thorax constituted two-fifths of all the cases of disease, those of the abdomen and senses each one-fifth, and of the nervous centres only a tenth. M. Barrier, after combating the opinion so generally entertained, that disorders of the nervous system cause the death of the greater part of the subjects who die before puberty, says (*loc. cit.*, t. ii, p. 233) that there is only one circumstance that in part justifies this opinion, which he opposes "not as false, but as exaggerated," and this is, that the affections alluded to are almost always of a dangerous character, that they are beyond the resources of art, and that they furnish a very considerable relative mortality. He says that, according to his experience, the mortality in diseases of the cerebro-spinal system has been as sixty-eight in a hundred, while in those of the thorax, senses (including the skin), and abdomen, it was respectively as forty-eight, forty, and thirty-two in a hundred.

Before beginning the consideration of the particular diseases of this class, we are desirous of stating that we shall be compelled, on account of our limited space, to devote attention chiefly to those which are most important from their frequency or severity, avoiding or merely alluding to those which are of less consequence, or which occur in childhood merely in common with adult life.

In our last edition we divided this subject into two classes, one containing all the diseases attended with and dependent upon, some appreciable alteration of the nervous centres, the second containing those in which no such alteration exists. We have, in the present edition, discarded that arrangement, principally on account of the minute researches of histologists during the past few years, which have all gone to prove the existence of positive and definite tissue changes in many diseases previously regarded as purely functional.

## ARTICLE I.

### TUBERCULAR MENINGITIS.

DEFINITION; SYMPTOMS; FREQUENCY.—This disease is characterized by violent cerebral symptoms, dependent upon the existence of tubercular granulations in the pia mater, as the essential anatomical lesion; accompanied, in the great majority of cases, by coincident inflammation of that membrane, by softening of the central parts of the brain, by effusions of serum into the ventricles, and in many instances by tubercular deposits in other organs. Formerly tubercular meningitis, simple acute meningitis independent of tuberculization, and simple dropsical effusion within the cavity of the cranium independent of inflammation, were confounded together under the single term of acute hydrocephalus or water on the brain. It has been shown, however, that a large majority of the cases of acute hydrocephalus of authors are, in fact, cases of tubercular meningitis, and more recent researches have further shown that most of the remaining cases are in reality due to the altered condition of the blood, called uræmia, and are independent either of any material lesion of the brain or of the presence of an excess of serous fluid in its cavities.

The term acute hydrocephalus ought to be therefore restricted to the single condition of sudden serous effusion in or around the brain, independent of any inflammation; a condition which only occurs in connection with the causes of general dropsy, and especially with renal disease, and is, indeed, merely the most rare form of internal dropsy, and, as such, not to be regarded as a separate disease. A description of the symptoms of this condition will be found in our remarks upon the renal complication of scarlatina.

There can be no doubt that tubercular meningitis is of rather frequent occurrence, though we are acquainted with no statistics excepting those given by M. Barrier (*loc. cit.*, t. i, p. 34, 36), which will enable us to form anything like an accurate idea upon this point. That author states that during the period in which his observations were carried on at the Children's Hospital in Paris, there occurred 576 medical cases of all kinds

In this number there were only ten cases of tubercular meningitis, whilst there were 83 of pneumonia, 48 of pleurisy, 24 of typhoid fever, 48 of measles, &c., &c., showing the first-named disease to be much less frequent than many other affections. We may also form some idea of its frequency in proportion to other diseases, by a reference to the work of MM. Rilliet and Barthez (1ère édit.), who report 33 cases of tubercular meningitis, against somewhat over 245 of pneumonia, 174 of bronchitis, 111 of typhoid fever, 167 of measles, and 87 of scarlet fever. We are of opinion that it is not of frequent occurrence amongst the easier classes of this city, since we have met with only 31 cases in private practice in the course of twenty-five years. From what we have been told by other practitioners, however, it seems probable that it is much more common amongst the destitute classes, and particularly the blacks, who crowd the southern parts of the city, and who suffer to a great extent from tubercular and scrofulous diseases. It is, however, impossible to obtain accurate information in regard to the frequency of the disease in this city, in comparison with other affections of the brain, from a reference to the bills of mortality, because of the fact that all or nearly all these affections are returned under the titles of dropsy and inflammation of the brain.

Predisposing Causes.—MM. Rilliet and Barthez (2ème édit., t. iii, p. 511) state that the disease is very rare in the first year of life; that it becomes notably more frequent in the second year, but that it is between two and seven years of age that it occurs with the greatest frequency. After this it diminishes, they say, rapidly from eight to ten, and especially from eleven to fifteen years of age. The influence of *sex* has not been determined, but it appears probable that boys are somewhat more subject to it than girls. It has been clearly shown by the observation of various writers that the disease usually attacks delicate children, and especially those born of parents who are either themselves laboring under tuberculosis, or in whose families that diathesis has existed to a greater or less extent. Of the 31 cases that have come under our own observation, in 20, one of the parents either had phthisis at the time, or died of it subsequently; in 3, one or the other parent came of a tuberculous family, though in these both parents were living at the time in seeming good health; in 4, no trace of tuberculosis could be found in the parents or in their families, and in 4 the history of the parents and of their families could not be traced out. It is not uncommon for several children in a family to die of tubercular meningitis. Under these circumstances, it has nearly always been ascertained that the parents, or some of the immediate relations, have either died of tuberculous or scrofulous disease, or shown unequivocal signs of that diathesis. Thus, 4 of the above-mentioned 20 cases occurred in two families, in one of which the father is since dead of phthisis, and in the other the mother has long been ailing with inactive tubercle of the lungs, and slow caries of a bone, in all probability of tuberculous origin. It may follow other diseases, and has been observed particularly after measles and other fevers, and after the suppression of eruptions.

M. Barrier (*op. cit.*, t. ii, p. 379) explains, and we think with good show of reason, the causes of the disposition on the part of the tubercular diathesis in children to localize itself in the brain, as well as the disproportionate violence and extent of the inflammatory action in proportion to the degree of the tubercular lesion, by the physiological conditions of the nervous system in early life, which are those of great functional energy and nutritive activity.

As to the *exciting causes*, nothing positive is known. The disease has been supposed to be brought into action by falls and blows upon the head, by violent moral emotions, and by exposure to the sun. These causes, however, are all of doubtful influence.

ANATOMICAL LESIONS.—The tubercles which constitute the essential anatomical element of the disease are very rarely found upon the free surface of the arachnoid, but almost invariably beneath that tissue, or in the meshes of the pia mater. They usually appear as more or less opaque gray granulations, the so-called *miliary tubercles*, and may generally be seen through the arachnoid, scattered about in the shape of small, rounded, or flattened bodies, of grayish or yellowish-gray color, and varying in size from two-fifths to four-fifths of a line. When the finger is passed over the arachnoid above them, they may be usually felt as little granular bodies. Their size, however, varies very much, and they are in some cases so small and so closely resemble in color the surrounding parts, that it requires a careful search to detect them. They vary also greatly in number, being in some cases thickly scattered over a considerable extent of the pia mater, while in other cases but two or three can be discovered on each hemisphere.

Frequently they can be detected with most ease upon the processes of pia mater which dip down between the convolutions, so that if we fail to find any granulations upon the surface, we should always strip off the pia mater and carefully examine these processes. Upon a careful examination of the arrangement of the miliary tubercles, it will often be observed that they are clustered about the small arterioles of the pia mater, and evidently follow in their distribution the branches of these vessels.

These granulations are not found upon all portions of the brain equally in cases of tubercular meningitis. On the contrary, they are rarely present upon its convexity or lateral aspects, while they are uniformly present at the base, and especially about the optic chiasm and the fissures of Sylvius.

Upon *microscopic examination* of one of these granulations, its tissue is seen to be composed of numerous oval cells with a single nucleus, though there are also some larger cells mixed with these which contain several nuclei. In many instances, as has been observed by Cornil,[1] Hayem,[2] Bastian,[3] and ourselves,[4] the tuberculous granulation will be seen to envelop a small arteriole, whose calibre is obstructed at the point of its development. There is also marked proliferation of the cells of the peri-vascular sheath of the vessel for a varying distance on either side of the granulation, and it is highly probable that it is from these cells that the granulation has been developed.

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[1] Arch. de Phys. Norm. et Path., 1868, p. 98.

[2] Etudes sur les Diverses Formes d'Éncephalite, Paris, 1869.

[3] Edin. Medical Journal, 1867, p. 875.

[4] Trans. of Biological and Micros. Section of Acad. of Nat. Sci. of Phila., 186[illegible]

We think it probable that some of the granulations may also be developed from the cells of the connective tissue, which holds together the vessels of the pia mater.

These miliary tubercles precede the occurrence of the inflammatory changes in the meninges described below, and sometimes it happens, in very acute cases, that the only lesions discoverable consist of a few gray granulations scattered in the meshes of the pia mater. It is not probable, however, that they exist any great length of time without giving rise to meningitis, since they are usually found associated with more or less abundant inflammatory exudation, which surrounds and often conceals them. The chief seat of this inflammation, as of the tubercular deposition, is the pia mater; the arachnoid membrane being, as a general rule, affected only to a slight extent. That membrane sometimes, however, contains a very small quantity of clear or turbid serum in its cavity. Its surface is often dry and viscid, and in some instances its whole tissue is opaque and thickened. But it is chiefly in the pia mater that are found the evidences of severe inflammation. In order to detect these changes, it is necessary to examine the membrane not merely upon the surface of the brain, but to tear it off, so as to bring into view the portions which dip in between the convolutions, and which often exhibit the greatest amount of morbid alteration. The inflammatory lesions vary between mere vascular injection, infiltration with clear, turbid, or gelatinous liquid, and abundant formation of lymph. When the inflammation has gone beyond mere sanguine injection, it is marked by infiltration of the membrane with turbid, whitish, or sanguinolent serum, with pus, or with whitish or yellowish lymph. These products are, like the tubercular granulations which they imbed and often conceal, most abundant at the base of the brain, about the peduncles of the cerebrum, the optic chiasm, and in the fissures of Sylvius. In this respect the disease differs from simple meningitis, in which the results of inflammation are usually more abundant and well marked upon the convexity than at the base. The pia mater, which, in a healthy brain, can be readily detached from the surface of that organ, becomes, in cases of meningitis, particularly those which are violent, more or less adherent, so that in tearing it off portions of the cineritious substance, which is itself softened, come with it. The proper tissue of the membrane is thickened and indurated, the degree of thickening depending on the amount of infiltration.

After the changes in the pia mater, the most important anatomical feature is effusion within the ventricles. This was formerly thought to be the essential lesion of the disease, but recent researches have shown that it is absent in some instances which have followed in all respects the ordinary course of the malady. According to M. Barrier, effusion cannot be supposed to exist unless the ventricles contain from one and a half to two ounces of fluid, whilst Rilliet and Barthez assert that the normal ence of thick cream. The characters of the fluid vary in different cases. It is white, perfectly limpid and transparent, or may be turbid, either from being secreted in that condition, or from holding in suspension albuminous or purulent flocculi, or portions of the broken-down walls of the cavity. In some rare instances it is sero-sanguinolent. Rilliet and Barthez remark that the effusion which coincides with tubercular meningitis is different from that which accompanies tubercles of the substance of the brain. In the former it takes place rapidly, is turbid, exists in smaller quantity, and constitutes the condition formerly called acute hydrocephalus. In the latter it is secreted slowly and in considerable quantity, dilates the walls of the cranium, and constitutes one form of chronic hydrocephalus.

The brain itself presents various morbid alterations. The whole organ often seems enlarged, so that the dura mater appears distended, and when the latter is cut into, the cerebral substance protrudes in the form of a hernia. At the same time the convolutions are observed to be pressed against each other, and the anfractuosities seem to have disappeared. The compression of the brain depends either upon the distending action of the ventricular effusion, or upon sanguine turgescence of the organ. In most cases, but not in all, there is evident congestion of the cerebral substance, shown by a more or less abundant dotted redness, and sometimes by a general rosy tint of the medullary, and vivid redness of the cortical portion. Softening of the substance of the brain is of common occurrence in connection with the other lesions. We have already spoken of the softening of the walls of the ventricles where there is much effusion and which in some cases appears to result from the macerating influence of the fluid. In many other cases, however, microscopic examination of the softened brain-tissue shows the effects of inflammation in the presence of numerous granule-cells, free granular matter, and a disintegrated condition of the nerve-fibrils. The lining membrane of the ventricles also presents abnormal appearances in a majority of cases. In some mation in a large proportion of the cases. We have also referred, very cursorily, to the softening which exists under the inflamed portions of the membranes, and which occasions adhesion of the pia mater to the brain beneath. In the latter cases the softening may be either red or white, and does not penetrate more than a line, and often less, in depth.

In addition to the changes already described, tubercles of the brain itself may be occasionally met with, having no connection with the meninges. These are found in various parts of the organ, and differ greatly in size, varying generally between that of a millet-seed and hazel-nut, but reaching sometimes the volume of a pigeon or hen's-egg, or even that of half the fist.

We have but few words to say in regard to the lesions of other organs. It is undoubtedly true that in the vast majority of cases tubercles are found in other parts of the body. Of all the cases of tubercular disease observed by Rilliet and Barthez, amounting to 312, in only one was the deposit confined to the meninges (*op. cit.*, 1ère édit., t. iii, note, p. 49). M. Valleix (*op. cit.*, t. ix, p. 196, 197) states, that in all the cases, without exception, of tuberculosis of the meninges in adults, tubercles exist also in the lungs, and that the same is true, in the vast majority of cases, in regard to children. The organs in which the deposit is most apt to exist are the bronchial glands, lungs, mesenteric glands, pleura, and peritoneum.

Another very frequent lesion is softening of the stomach. This may affect only the mucous or all the coats, so that a slight degree of force will suffice to tear the organ. Dr. Gerhard (*Am. Jour. Med. Sci.*, vol. xiv, 1834) states, that lesions of the stomach existed in six of the ten cases detailed by him, and in four-fifths of others not detailed.

Before quitting this subject, we would call the attention of the reader to the fact mentioned by M. Valleix (*op. cit.*, t. ix, p. 214) that all the symptoms about to be described as constituting the disease under consideration, with the exception of paralysis, may depend on simple tuberculosis of the meninges. Several cases have been cited, in fact, in which the only lesion found after death consisted of granulations in the pia mater. No traces of inflammation were observed. It is clear, therefore, that the evidences of the disease, or symptoms, depend not merely on inflammation caused by the tubercular deposits, but on the presence of that morbid production. The paralysis, which is one of the important symptoms, is thought to depend chiefly on softening of the substance of the brain. The author referred to states that it occupies the side opposite that in which the change exists.

SYMPTOMS; COURSE; DURATION.—The disease has been divided by authors into different stages, founded on the predominance of certain symptoms at particular periods of its course.

These divisions are all imperfect and unsatisfactory, because the disease is in fact a continuous one, and for this reason some writers have avoided attempting any classification of the symptoms. We can, however, obtain a more faithful picture of the disorder by adopting the division made by M. Valleix, which, though arbitrary and imperfect, because of the want of a natural line of demarcation, seems warranted by the very great differences in the character of the symptoms at an early and late period of the affection. We shall therefore describe first the invasion of the malady, and then two stages or periods of the symptoms after the disease is confirmed.

The *invasion* of the disease may be either insidious or sudden. In a large majority of the cases, the onset is preceded by a well-marked prodromic period. The length of this period varies greatly in different subjects. Its duration is stated by MM. Rilliet and Barthez to be, as a general rule, between fifteen days and three months, scarcely ever less, and rarely more. During this period, the symptoms presented by the child are those which are usually held to be indicative of a failure in the general health. The nutritive functions especially show disorder. The appetite diminishes, or becomes capricious, there are alternations of constipation and diarrhœa, the body grows thin, the color pales, the gayety of childhood disappears, and the patient becomes listless, apathetic, and complains of being tired and weak; or he is irritable and peevish, or too mild and gentle; study and exercise both become distasteful, and there is a degree of weakness and debility which, though slight at first, becomes at length so evident as to arouse the attention of the parents, or those who have charge of the child. Besides these symptoms, there is often very great restlessness at night. The only pain complained of is headache, and sometimes abdominal pain. The headache is, in subjects old enough to notice and describe their sensations, often a prominent symptom. It is not constant, but occurs at intervals, and is sometimes severe, and its returns frequent. Fever is not generally present until after the more positive symptoms have fairly begun, and when present is generally slight and fugacious. The emaciation and loss of strength are seldom present to such a degree, in the prodromic stage, as to confine the child to the house. On the contrary, he continues to amuse himself at times, and to walk as usual.

The following is a rapid and summary account of the mode of invasion in the cases that have come under our own observation:

In one case, in a girl six years of age, the invasion was preceded during three months by occasional cough, and irregular attacks of fever, by progressive emaciation, paleness, languor alternating with extreme irritability, disinclination to take exercise, and during the latter part of the time by partial lameness, and in fact by all the signs of general tubercular disease. In another, which occurred in a boy eight years of age, it was preceded for several months by frequent complaints of intense headache, especially after taking active exercise, and by unusual languor, but no other symptoms. The boy was sent to a boarding-school apparently well, and was suddenly attacked there. In five cases the meningeal symptoms were developed in connection with those of phthisis, whilst in an eighth they followed a state of general weak health, with dyspeptic symptoms, which had lasted for several months. In a ninth case, a violent convulsion, seemingly dependent on a fit of indigestion, was followed during four months by irregular and diminished appetite, by some loss of strength and flesh, and by frequent attacks of severe headache, and at the end of that time, by the symptoms which denote inflammation of the membranes. In a tenth, after some months of gradual thinning and general debility, a convulsion occurred, also from indigestion apparently. This was recovered from, but a few days afterwards the symptoms of meningitis showed themselves, and followed their usual course. In an eleventh case, occurring in a girl ten years of age, there was a mild, almost continuous fever, lasting four weeks, and resembling most closely typhoid fever, except that there was no diarrhœa and only a very few doubtful rose spots, when severe frontal headache, vomiting, slow and intermittent pulse, with drowsiness, declared the invasion of tubercular meningitis. In a twelfth, a girl three years old, born of healthy living parents, presented for four days the signs of gastric catarrh, with, however, unusual irritability of temper alternating with a suspicious quiet. On the fifth day, there was just perceptible strabismus, after which the case went on in the usual way to a fatal result. In a thirteenth, in a girl five years old, of healthy living parents, but with tuberculous grandparents on the father's side, the general health failed slowly, with loss of appetite and flesh for one month. Then there set in lassitude, desire to lie about, with the most petulant irritability on the slightest disturbance, occasional vomiting, constipation, loathing of food, and gradual conversion of drowsiness into coma, and so on to the end. In the remaining cases that we have seen, the invasion was preceded by much less decided prodromic symptoms.

After the different phenomena above described as characteristic of the prodromic stage have continued during a variable length of time, the disease enters into activity, a change which is ushered in by three important symptoms: *headache*, *vomiting*, and *constipation*, to which is added, in a large majority of the cases, slight *acceleration* of the circulation. At the same time the *intelligence* remains perfect, the *strength* is not greatly diminished, the *appetite* is not entirely lost, and the *thirst* is moderate.

*First stage.*—The headache, vomiting, and constipation persist and become more marked. *Headache* is a nearly invariable symptom in children old enough to describe their sensations, and is therefore very important. In infants its presence is to be inferred when the child carries its hands frequently to various parts of the head, and presses strongly against it, and when the head is constantly rolled from side to side. It is generally frontal, and is usually referred to a point just over one or both brows. In other cases it extends over the whole head. It is commonly severe, so that the child when old enough complains of it spontaneously. In the case of a girl seven years old, whom we saw, it was so severe that she cried frequently and bitterly, begged to have the doctor sent for, and submitted willingly to any remedy suggested with a view to its relief. It is thought that the acute, shrill cry of the disease, to which the term hydrencephalic has been applied, depends on the acuteness of this pain. It usually lasts throughout the first stage, and ceases only as the delirium and coma of the second stage come on. *Vomiting* is also a nearly constant symptom. Of 80 cases collected from different sources by M. Barrier, it was absent only in 15, or less than a fifth. This symptom generally makes its appearance on the first day, rarely later than the second or third, and lasts two or three days, and sometimes longer. In one case that we saw, it lasted eleven days, though it was but slight on the tenth and eleventh. The matters ejected from the stomach consist of the ingesta, and of mucus and bile in various proportions. It is commonly repeated two or three times a day. *Constipation* is even more important as a symptom than the one last named. Of 87 cases it was absent only in 7, according to Barrier. MM. Rilliet and Barthez state, however, that it exists at the beginning only in about three-fourths of the cases. Where there is diarrhœa, instead of constipation, at the invasion, as sometimes happens, the former symptom almost always depends on tubercular disease of the intestine. Even under these circumstances, however, the diarrhœa is sometimes arrested, and constipation substituted under the influence of the cerebral disease. The constipation generally persists obstinately for several days, and then gives way under the influence of purgative medication, or is replaced spontaneously by diarrhœa with involuntary stools towards the termination of the case.

In connection with the three important symptoms just described, there are others, which, though less characteristic, are of much assistance in forming the diagnosis. The child is *dull* and *sad*, or *excited* and *irritable* by turns; he shuns the *light*, or closes the eyelids and contracts the brows when it is thrown upon the face; his hearing becomes painfully acute, so that sudden and jarring sounds distress and irritate him; the *sleep* is restless and disturbed, and accompanied by grinding of the teeth: and he utters from time to time, both sleeping and waking, the peculiar shrill, sharp, and sudden scream, which seems to depend upon internal pain, probably headache, and which has been called by Coindet the *hydrocephalic cry*. In young children, those who have not yet learned to put their sensations into words, a peculiar, apparently causeless, obstinate peevishness and positive ill-temper, shown by sudden, sharp crying at any disturbance, as even the kindness of a father or mother, especially when this alternates with sluggishness or drowsiness, and when there is no evident disease of a painful or exhausting kind to explain such a state, ought to arouse the fears of the physician as to the possible inception of this disease, even when there is as yet no vomiting or distinct signs of headache to call attention to the brain. The general as well as the special sensibility, is sometimes, but not by any means always, exaggerated at this time. Rilliet and Barthez met with exaltation of this function only in four of their patients. The *intellectual faculties* remain undisturbed in the majority of the cases during the first few days, and this fact, which is so contrary to what might be expected, is one of the utmost importance in the judgment of the case. We remember being asked by a little girl seven years old, to whom we have already referred, "why it was that she saw double; why she saw two mothers and two doctors?" At the time when she first asked the question there was no perceptible strabismus, but on the following day we thought we could detect a deviation of one of the eyes from its proper axis, and on the third day the deviation was very marked, though the poor child still wondered why she saw two objects instead of one.[1] In another case in a boy five years old, there was no disorder of the intelligence until the eleventh day, when there was slight delirium alternating with somnolence; yet it was clear from the first that the attack would prove one of tubercular meningitis, from the coexistence of violent frontal headache, obstinate vomiting, constipation, slow and irregular pulse, and the absence of other local or general symptoms. In only a fifth of the cases observed by MM. Rilliet and Barthez was there perversion of the intellectual faculties at the invasion. Let us observe, moreover, that even when children present some of these disorders early in the attack, they generally consist only of slight delirium, dulness of the intelligence, slowness and hesitation in answering questions, disposition to somnolence, excessive irritability and peevishness of temper, and what is more important and characteristic than any of these, perhaps, of a certain expression of the countenance, and particularly of the look, which is expressive of astonishment or of the utmost indifference. The look is, in fact, fixed or staring, like that of one in a mild ecstasy. Even when these symptoms exist, however, at an early period, they not unfrequently alternate with the most perfect clearness of the faculties, so that the physician in private practice, who sees his patient only at long intervals, and for a few moments at a time, should never venture to disbelieve, without due consideration, the account of the mother or nurse as to their occasional presence during his absence, even though never observable during his visit. We knew this to happen in regard to two boys of eight and ten years of age respectively, whose mothers constantly insisted to the physician in attendance that during his absence the children occasionally presented slight delirium, and a wild uncertain expression of the countenance, which made them fear that the brain might be affected. As the children's intelligence was perfect, however, whenever the doctor saw them, he determined that the mothers were fanciful through over-anxiety, and ascribed the sickness to a bilious disorder of the stomach. After a few days the cases developed themselves, and the boys died with every symptom of tubercular disease of the brain.

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[1] USE OF THE OPHTHALMOSCOPE IN TUBERCULAR MENINGITIS.—In this disease, as in acute simple meningitis, the obstruction to the return of venous blood through the sinuses produces in both eyes, but especially in the one corresponding to the hemisphere where the inflammation is most intense, congestion and œdema of the optic papilla and surrounding tissue (Bouchut's peripapillary congestion); tortuosities and varicosities of the retinal veins; and occasionally thrombosis or rupture of these vessels, causing minute hemorrhages in the retina. In some cases the size of the globe is increased, owing to hydrophthalmia. These lesions are indeed more frequent in this disease than in simple meningitis, since the inflammation and resulting exudation are more apt here to involve the base of the brain, and cause a greater degree of obstruction to the circulation.

These retinal lesions cannot be regarded as pathognomonic of the existence of this disease, and are therefore only valuable as confirmatory of the general symptoms, save in certain cases where the development of the ocular lesions before the appearance of the more characteristic symptoms might enable the diagnosis to be made at an earlier date than would be possible without ophthalmoscopic examination.

When disorders of intelligence do not occur in the early days of the attack, they usually make their appearance about or soon after the fifth day.

During the first stage the *coloration* of the face ought to be noticed. It is generally paler than natural, though from time to time a sudden flush of redness may be seen to pass over it. The condition of the senses is natural, except that the acuteness of the eye, ear, and sometimes that of touch, are exalted, so that the child avoids the light, starts at sudden or loud sounds, and cries when it is touched or moved. The *respiration* becomes unequal and irregular, and is interrupted by sighing or yawning.

*Convulsions* rarely occur in the first stage. MM. Rilliet and Barthez conclude that meningitis without complication of tuberculous disease of the cerebral substance, never begins with convulsions. In one of the cases that came under our charge, a severe and prolonged convulsive seizure did occur, however, on the very first day of the attack of the disease. The subject of the case was a boy between four and five years old. The death took place on the eighteenth day, and the autopsy showed no tubercular disease of the cerebral substance. It is proper to state, however, that the child had eaten on the morning of the day that he was attacked, a most unwholesome meal, and it is very possible, as we in fact supposed at the time, that the convulsions were caused by the presence in the stomach of undigested food. When they do occur in tubercular meningitis, they may be limited to the extremities, upper lip, eyeballs, or they may be general. Sometimes the child dies in a convulsion. They are generally much less important as a symptom, according to M. Valleix, than in simple acute meningitis.

The *tongue* remains moist; the *appetite* is not entirely lost; *thirst* is moderate; the *constipation* continues, unless removed by treatment; the abdomen becomes *retracted*, so that its walls approach closely to the spinal column, and allow us to feel the pulsations of the aorta without using more than very slight pressure. The latter symptom comes on gradually, and is generally well marked by the sixth day or a little later. MM. Rilliet and Barthez regard it as a very important sign, and state that they have observed it almost exclusively in cerebral affections. They think it depends not upon contraction of the abdominal muscles, but upon retraction of the intestines. We can corroborate by our own experience the evidence of the above authorities as to the value of this symptom. It has been very marked in the cases that we have seen.

The state of the *circulation* is of the utmost importance in forming the diagnosis. So true indeed is this, that Dr. Whytt, of Edinburgh, whose description of acute hydrocephalus, published in 1768, has been most highly commended by all recent writers as a singular instance of accurate observation, makes three stages of the disease, each of which is characterized by the state of the pulse. In the early part of the attack the pulse is accelerated, rising to 110, 120, or, according to Whytt, in a few cases to 130 or even 140. At the same time it is neither full nor tense, as a general rule, but rather soft and compressible. This condition of the pulse changes, as we shall find, in the middle period of the disease, and again shortly before the fatal termination. The *heat* of the skin is usually moderate and sometimes quite natural, at this time, as might be supposed from the state of the circulation.

*Second stage.*—This stage begins about the time the more marked nervous symptoms show themselves. The headache generally subsides or ceases at the beginning of this period and gives place to *delirium*. This occurs usually somewhere between the sixth and twelfth days. The delirium which occurs has been generally supposed to be always mild and calm. MM. Rilliet and Barthez state, however, that in one-third of their cases it was intense, and accompanied with cries, agitation, and frequent changes of position. In most of the cases, however, it is mild, and is manifested in older children by their muttering unintelligible words, by inattention to what is going on around them, by an expression of wildness and astonishment, and by their giving hesitating answers to questions. In children under two years of age there is no proper delirium. There is, however, an analagous condition, which is characterized by disorder of the two faculties of attention and perception. The delirium seldom lasts more than two or three days, and generally alternates with somnolence, so that the child is either dozing and sleeping, talking in its sleep, or frequently waking with loud cries, and restlessness. The *general sensibility*, which may have been exaggerated in the early period of the disease, is diminished in the early part of the second stage, or about the seventh day, and completely abolished towards the end. The face in the second stage is almost always pale, or pale and flushed alternately. During this stage, and especially during the latter part of it, it is very common to see sudden alterations in the color of the face. Sometimes without any apparent cause, but more frequently from disturbances of any kind, as from pain or from external influences acting upon the child, such as moving it, or the administration of food or medicine, the face becomes suffused of a more or less deep pinkish or scarlet tint, the color beginning faintly at first and gradually deepening and expanding until it covers the whole face and forehead, and then as gradually fading away. It is during this stage also that another symptom, which we have often noticed, and to which M. Trousseau has called attention, may usually be observed. M. Trousseau refers to it as a red line or spot remaining upon the skin of the forehead or abdomen when the finger has been drawn across it, and has given to it the name of "*tache méningitique*," or "*tache cérébrale*." We had often remarked, before knowing that M. Trousseau had drawn attention to this phenomenon, that the slightest pressure with the finger on any part of the face or forehead, caused the appearance at the point of pressure, of a spot of a peculiar pink or rose color, which, like the flush above referred to, began faintly, became more or less deep in tint, remained a few moments, and then as gradually faded away. This is no doubt one of the diagnostic symptoms of the disease. We do not recollect to have seen it in any other disease, except once in a severe case of typhus fever in an adult, in whom it was exceedingly marked. In this disease we believe it may always or nearly always be detected. Occasionally contractions pass over the features, giving rise to grimaces, after which quency, of paralysis, which is generally partial; contraction with rigidity of the limbs; stiffness of the muscles of the back of the neck, causing retraction of the head; stiffness of the trunk; spasmodic closure of the jaws; carphologia; subsultus tendinum, and convulsions. The paralysis is almost always partial and of very limited extent, affecting, for instance, the jaw, the orbicularis muscles of the eyelids, the levator of the upper eyelid, the tongue, or one side of the face. It is very rare to see one of the limbs paralyzed. Contraction with rigidity of the muscles is an important symptom, but is not always present. When it exists it generally appears at an advanced period of the attack, commonly between the seventh and thirteenth days, and is usually partial. It may affect either the extremities, back of the neck, trunk, or inferior maxilla. It is seldom permanent, but after lasting one or two days, disappears, to reappear at a later period. The carphologia, subsultus, and chewing motion of the under jaw generally occur only a few days before death, and last but a few days.

The *decubitus*, in the early part of the second stage, is generally lateral, with the thighs flexed upon the pelvis, the legs upon the thighs, the arms applied against the thorax, the elbows bent, and the hands placed in front: the decubitus, called by the French "*en chien de fusil*," or *gun-hammer*. At this time the child will still occasionally move its position with facility, showing that strength is not by any means entirely lost. At a still later period the decubitus is dorsal. In the latter part of the first and early part of the second stage, the *pulse*, which we have ascertained to be accelerated at the invasion, falls to the natural standard, or becomes slow, and at the same time irregular. From 110 or 120, as it was, it now sinks to 90, 80, 60, or, as happened in one instance to M. Guersant, to [illegible] in the minute. Coincidently with this change it almost always becomes irregular. The irregularity affects both its force and frequency, so that a strong pulsation may be followed by a feeble one, or the rhythm may be regularly or irregularly intermittent. The irregularity varies greatly in frequency, so that it counts at first 112 or 120, and gradually increases to 140, 160, or even 200 the day before, or that on which death takes place. Simultaneously with this change it also becomes extremely feeble and small, and often ceases to be perceptible at the wrist on the last day. The *heat* of skin generally increases with the acceleration of the pulse. This is not invariable, however, since in some cases the temperature remains but moderately elevated, about 101° or 102° until death; and in others an algid condition precedes death, in which the temperature falls as low as 79.4°. (*Reynolds's Syst. of Medicine*, vol. ii, p. 379, art. Tuberc. Meningitis.) During the last few days the surface is often covered with an abundant perspiration; the tongue becomes dry; the teeth and gums are fuliginous; the exhaustion increases; the respiration becomes stertorous, unequal, difficult, and anxious, and at the very last attended with great dyspnœa; and the urine and stools are discharged involuntarily. Death finally occurs in this condition, or is hastened by an attack of convulsions. In some cases it is most lingering. In one instance we expected the death of a young child in this disease every day for eight in succession.

The *duration* of tubercular meningitis is exceedingly variable in different cases. As a general rule it lasts between eleven and twenty days, though it may continue a considerably longer time. Rilliet and Barthez have never known death to occur before the seventh day.

DIAGNOSIS.—The diseases with which tuberculosis of the meninges is most likely to be confounded are simple meningitis and typhoid fever. It might also be confounded, though this is much less probable, with the cerebral symptoms which complicate the exanthemata and some local diseases, especially pneumonia, and to which symptoms, as a group, M. Barrier has applied the term pseudo-meningitis.

The diagnosis between tubercular and simple meningitis will be best understood from the following synoptical table, extracted from the last edition of the work of MM. Rilliet and Barthez.

| SIMPLE ACUTE MENINGITIS. | REGULAR TUBERCULAR MENINGITIS. |
|---|---|
| I. The subjects of acute simple meningitis are usually robust and well developed, and present no trace of either internal or external tubercular disease. Born of healthy parents. | I. Subjects of tubercular meningitis delicate, puny, exhibiting often precocious intelligence and sensibility. Have sometimes had, in infancy, enlarged glands or chronic cutaneous eruptions; the parents, or brothers and sisters, often present the signs of tubercular disease. |
| II. The disease may prevail epidemically. | II. Disease always sporadic. |
| III. *Condition prior to invasion.*—The disease begins in the midst of the most blooming health, or, if secondary, it occurs in the course of, or during the convalescence from, some acute non-tubercular disease, or it follows an external cause. | III. *Condition prior to invasion.*—For some months or weeks the patients grow languid, lose their strength, become pale, emaciate; their temper changes, they are dull, they lose appetite, the digestion is deranged, &c. Absence of prodromic symptoms is rare. |

| SIMPLE ACUTE MENINGITIS. | REGULAR TUBERCULAR MENINGITIS. |
|---|---|
| IV. *Mode of Invasion.*—Violent convulsions attended with intense febrile movement, and with very hurried respiration in young infants; or very acute frontal headache, accompanied by fever, bilious vomiting, and towards the end of the first, or in the course of the second day, at the latest, excessive restlessness, preceded or not by somnolence; most violent delirium; formidable ataxia. | IV. *Mode of invasion.*—Never with convulsions at the onset; the change from the prodromic to the acute stage sometimes imperceptible. It takes place by a progressive increase of the symptoms before mentioned, and by the setting in of headache; in other cases, the acute state is better marked by headache, vomiting and constipation; generally, the intelligence remains clear; no ataxia. In the rare cases in which there is ataxia at the onset of the acute symptoms, the prodromic stage, above described, has been observable, or the meningitis has occurred in the course of advanced phthisis. In cases in which no prodromes exist, the meningitis begins with vomiting, constipation, moderate headache, and slight febrile movement; ataxia, if it is to appear, occurs later, and a mistake is impossible. |
| V. *Symptoms.*—*Very intense* headache, *obstinate* vomiting, *moderate* constipation, *violent* fever, *high* delirium. | V. *Symptoms.*—Not *very intense* headache, vomiting *less frequent*, *very obstinate* constipation, *very moderate* fever, slowness and irregularity of the pulse, delirium usually mild. |
| VI. From the beginning, the aspect of a grave disease of ataxic form. | VI. Invasion insidious, with the aspect of a mild disease. |
| VII. Course rapid, aggravation progressive and continuous; convulsion after convulsion, or else violent delirium, extreme agitation, violent fever, &c. | VII. Course slow, preservation of the intelligence to an advanced period, fever slight, and some slowness and irregularity of the pulse, sighing, changing color of the face, eye dull or ecstatic, &c. |
| *Duration.*—Disease of short duration, ending sometimes in 24 or 36 hours, but lasting generally from three to six days, and seldom more. | *Duration.*—Always much longer in the regular form. |

We will remark in regard to this table, which is, in most respects, admirable, that we have never met with more intense and persistent headache than we have in some cases of the disease under consideration. In some of our cases this has been a most prominent and striking symptom.

Before quitting the subject of the diagnosis of these two affections, it is desirable to state for the information of the reader, that some of the highest authorities acknowledge it to be sometimes nearly or quite impossible to distinguish between them. This is the expressed opinion of MM. Guersant, Rufz, Barrier, and Valleix.

From typhoid fever, tubercular meningitis is to be distinguished by the antecedent history of the patient, which often reveals the existence of a tubercular diathesis in the latter affection; by the symptoms of the invasion, which in meningitis consist of severe and persistent headache, frequent vomiting, and constipation, whilst in typhoid fever the headache is less severe and less persistent, the vomiting much less frequent, and the constipation replaced by diarrhœa; by the different characters of the febrile movement, which, in typhoid fever, is more marked, and attended with a frequent, full, and regular pulse, while in meningitis it is less marked and is accompanied after a few days by slowness and irregularity of the pulse; lastly, in meningitis, the constipation is obstinate, the abdomen retracted, and there are various important and characteristic lesions of motility, and the special senses; in typhoid fever there is diarrhœa, the abdomen is distended and meteoric, there are characteristic rose-colored spots, whilst there are no considerable lesions either of motility, or of the special senses.

In one of our cases we made this mistake. And yet, on looking back at the case, we could see that the very moderate heat of skin, the absence of diarrhœa and of epistaxis, and the imperfect development of the eruption, which consisted only of a few faint rose spots on the abdomen, ought to have led us to suspect that the fever was of the tuberculous, and not of the typhoid form.

It is unnecessary to do more than allude to the possibility of confounding the disease with the exanthemata, or with local diseases accompanied by cerebral symptoms, and particularly with pneumonia in very young children. The resemblance of pneumonia of the apex of the lung in the early stage, to tubercular meningitis, has been referred to in the article on pneumonia. The diagnosis must be made by careful consideration of the symptoms peculiar to each, and in the case of a local disease, by accurate physical examination of all the important organs of the body.

Prognosis.—M. Barrier, in speaking of the prognosis of this affection, says: "The gravity of tubercular meningitis is not surpassed by that of any other disease. Thoracic and abdominal phthisis, though almost constantly fatal, pursue a slower course, and last a longer time. We may even allow as proved, that in a small number of cases, they are susceptible of cure, or may remain stationary for months or years. Unfortunately it is not so in regard to tubercular meningitis." MM. Rilliet and Barthez, in their second edition, do not express the same entire hopelessness as to recovery from the disease, that they did in their first. They say, amongst other conclusions (*op. cit.*, t. iii, p. 510), that there are on record incontestable examples of the complete disappearance of the symptoms, but remark, that such cures have occurred in the first stage, or in the first half of the second stage, after seven or eight days of sickness, rarely later, and after alternations of amelioration and aggravation. They state also that, in excessively rare instances, a return to health has been obtained even in the course of the third stage, after many weeks of illness. They are of opinion that the disease often returns and proves fatal in from one to five years and a half after the recovery. The cause of the relapse is to be found in the fact that the local lesion remains, and that the diathesis has not been eradicated. M. Valleix is of opinion that after having acquired the conviction that a case is really one of tuberculosis of the meninges, we should regard the patient as lost; "for the exception that I have mentioned (a case belonging to M. Rilliet, then unpublished), even did no doubt as to the exactness of the diagnosis remain,

lesions of motility and sensibility), he has never seen any reco
momentarily. Dr. George B. Wood (*Prac. of Med.*, vol. ii, p. 3
that he has "never seen a well-marked case of tuberculous
end favorably."

We shall quote but one more authority as to the prognosis
ease. Dr. Robert Whytt (*Works of Robert Whytt, published*
quarto, Edinburgh, 1768, p. 745), says: "I freely own, that I
been so lucky as to cure one patient who had those symptoms
certainty denote this disease; and I suspect that those who im
have been more successful have mistaken another distemper
Our own experience coincides with the mass of evidence give
to the almost hopeless fatality of the disease. The thirty-one
we have seen all proved fatal. A case, however, came under
vation, in 1850, which might, perhaps, be classed as a reco
tuberculosis of the meninges, though not from tubercular
since there were no well-marked signs of inflammation of the
of the brain, though there was every reason to suppose that the
depended on the deposit of tubercles in those membranes. Th
as follows: A girl between four and five years old, whose mothe
laboring under tubercular disease of the summit of one lung (
since proved fatal), and who had lost several brothers and si
consumption, had had nearly constant cough during the winter
During the months of April, May, and June, of 1850, she had
all the signs of induration over the upper two or three inches o
lung, before and behind,—marked dulness on percussion and
respiration, but no râle. For these symptoms she had been tr
cod-liver oil, iodide of iron, opium for the cough, and good di
the middle of June she complained frequently of headache, had
vomiting without any gastric derangement, and was much disp
constipated. She had no appetite, grew thin, and was very langui
and weak. On the 27th of June the mother thought

pated, we ordered half a grain of calomel morning and evening. After three doses she was purged. This relieved her a good deal, there being less headache, more appetite, and an improvement in color afterwards. But still there was every day some vomiting, complaints of headache, and more or less listlessness and heaviness in the morning, while in the afternoon she would brighten up and seem better. The intelligence continued perfect; the temper was rather irritable, but not very much so.

The treatment after the 29th of June was calomel, given as above stated, from time to time, to keep the bowels soluble; cod-liver oil, a teaspoonful twice or three times a day, as the child would take it; mustard foot-baths every day or two; and meat, bread, and ice cream for diet. On the 5th July we ordered half a grain of iodide of potassium, three times a day, in addition to the oil.

On the 11th July, she was taken, by our direction, to the seaside, where the use of the oil and of the iodide of potassium was to be continued.

On the 7th of August she was brought back from the seaside, and we saw her on the 8th. We were astonished to see how well she looked. The strabismus had entirely disappeared. We were told that it had begun to diminish two weeks after her arrival at the sea, and had then gradually disappeared. She had grown somewhat, though not very much, fatter. Her whole appearance was very much improved. The coloration of the body, the expression of the face, were both much better; she was much stronger, running about, in fact, all day; she ate well, and with the exception of a little cough, and a rather delicate frame, looked very well. Except one day, she was well all the time at the seashore. On that day she was feverish, had much headache and vomiting, and laid abed. The cod-liver oil and iodide of potasium were ordered to be continued.

The child remained pretty well throughout the winter of 1850–51. There was no return of either the strabismus or the vomiting. She was thin, pale, and delicate-looking, coughed occasionally, and the solidification of the summit of the lung continued, but she was not confined to the house. Late in the winter she went south with her mother, and there, after having become quite stout and healthy during their travels, died of dysentery in April or May. The mother died in 1852 of phthisis, with large cavities in both lungs. Another case in which the early symptoms of the disease were well marked, and in which recovery took place, will be detailed in the remarks on prophylactic treatment.

We have seen but two other cases which gave us the least reason for hope, after we had once supposed the children attacked with the disease. One occurred in a boy eight years old, who had been suffering for two weeks before we saw him with violent frontal headache, frequent vomiting, constipation, slight fever, and somnolence. We fully expected that this would prove to be an attack of tubercular meningitis. A large dose of calomel followed by castor oil, and free leeching to the temples, relieved him in two days perfectly, and he has remained well ever since, though this was nearly twenty years ago.

The second occurred in a boy also eight years of age, whose father had died a few years before of phthisis, the younger brother died of tuberculous

of ammonia every three hours. Under this treatment he im
ten days had quite recovered. The diagnosis at the time w
meningitis in the early stage. His mother removed fro
Washington, where he died on the 30th of June of the sa
an illness of twenty-one days, of what was called water on t

In another case to which one of us was called in consult
whose mother had died a few years before of diabetes mellit
father's family was tuberculous, presented a series of sympt
could explain only as the result of slow thickening of the
the base of the brain, in all probability the result of a tuber
This child had, for several weeks, violent frontal headache,
loss of flesh, lassitude, a peculiar one-sided or lateral gai
strabismus, and great impairment of vision, so that he coul
object only by bringing it almost in contact with the face
scarcely any disturbance of the circulation, and only sligh
at night. He was treated at first with rest, nutritious food,
of bichloride of mercury in combination with iodide of pot
times a day, and then when he began to improve, with ti
chloride of iron and cod-liver oil for a long period. He fina
his health, grew stout and strong, but has remained ever s
that he reads with great difficulty, but manages to pick his
a room or the street, with only occasional stumbling. The ill
several years ago, and he is still living in good general
time (1869).

Are we then to abandon all hope of deriving any good
means in the disease under consideration? To this most seri
we ought clearly to respond in the negative. The grounds
ing hope are first, the evidence of M. Guersant that he ha
which appeared to be tubercular meningitis recover in th
Let it be supposed, even, that they were cases of simple i

and MM. Rilliet and Barthez, in their second edition, as above quoted, assert its occasional curability. We know of the occurrence of a case in this city, under the charge of one of our friends, than whom we believe no one can be more competent to make a correct diagnosis, in which, after the child had presented in regular order all the early symptoms of the disease, and had arrived at the last and most hopeless stage, perfect recovery, to his utter amazement, gradually took place. This child, when our friend last heard of it, three months afterwards, was in all respects strong and hearty. No doubt the probabilities are that the case was one of simple meningitis, but who could have known this at the time; and should it not deter us from abandoning all hope, and, as a consequence, all active treatment, when we seem to have under our hands a case of this dreadful malady? Our own cases, given above, also go to prove that the disease is sometimes curable in its early stages.

It is important, in tubercular meningitis, to avoid making a positive prognosis as to the period at which death will occur, notwithstanding that the patient may present every mark of an immediately fatal termination. We have already adverted slightly to this subject. On one occasion we expected the death of a patient with this malady for three days in succession, and on another, we visited a child for a week, during every day of which it seemed as though existence could not endure until the next. It had during this time profound coma, subsultus tendinum, and enlarged pupils; the eyelids were half open, the eyes constantly oscillating, or else rigidly distorted, and both corneas dimmed and slightly eroded, from constant exposure to air and light. Convulsions occurred from time to time, the pulse was variable, and at times exceedingly frequent, and indeed everything threatened a speedy termination. MM. Rilliet and Barthez say, "Often have we inscribed upon our notes *death imminent*, and been astonished the next day to find still alive, children to whom we had allowed scarcely two hours of life."

The symptoms which most positively indicate the near approach of death are, livid color of the face, sweats occurring about the face, glassy expression of the eye, dry and incrusted nostrils, and especially a very rapid pulse, and the various nervous symptoms mentioned, as carphologia, subsultus tendinum, and general convulsions.

TREATMENT.—In the last edition of this work we took the ground that it was proper in the early stage of the disease to employ bloodletting. Further experience and knowledge compel us to retract this opinion. We believe now, that abstraction of blood should not be resorted to unless when the diagnosis between this disease and simple meningitis is very uncertain. Where there are no marked signs of active inflammation, where, from the family history, from the absence of marked fever, and the peculiar state of the pulse, we have every reason to believe that the low-typed inflammation present is the result of the presence of tubercle, we deem it safest to avoid all lowering measures. The case is so critical, so almost hopeless from its very nature, that we prefer a treatment based on the theory of promoting a retrogression of the tuberculous deposit. The only measures which, in an experience of twenty-seven years, one of us has found to delay and, in the cases referred to in the article on prognosis, to cure the disease in part, have been the following: quiet of body and mind, obtained by means of rest in or on the bed, in a pleasant room, with attendants who know how to soothe and still the child. We always insist upon a nutritious diet: and one consisting mainly of milk or cream, or the two mixed, with beef tea, bread and butter, if the patient will take it, or milk-toast, in moderate quantities every three or four hours, a soft-boiled egg, or the yelk of a hard-boiled egg, once or twice a day, is what we usually endeavor to get the patient to take. A mustard foot-bath two or three times a day, is always safe, and we think useful and tranquillizing. The bowels should be moved gently once a day, or every two days, by means of an enema or some simple laxative, as simple syrup of rhubarb. Active purgation we have found of no use. As remedies, we prefer the following:

| | |
|---|---|
| ℞.—Tr. Ferri Chlorid., . . . . . . . | fʒj. |
| Acid. Acet., Dil., . . . . . . . | fʒj. |
| Liq. Ammon. Acetat, . . . . . . | fʒij. |
| Syrup. Simp., . . . . . . . . | f℥j. |
| Aquæ, . . . . . . . . . . | f℥ijss.—M. |

A teaspoonful at five years of age, every three or four hours.

In connection with this, we give half a teaspoonful of cod-liver oil emulsion three times a day. Calomel we have abandoned of late years entirely, as it has utterly failed in our hands to do any good.

*Iodine* has been very much employed as a remedy in this disease, both in the forms of Lugol's solution and iodide of potassium. Perhaps the strongest argument which exists in its favor is the benefit which often follows its employment in other scrofulous and tuberculous diseases, though there are several cases in which it is asserted to have been successfully used in tubercular meningitis. Iodine itself is comparatively little used. M. Rilliet (*op. cit.*, t. iii, p. 308, 1847) states that it has entirely failed in his hands in the tubercular form of the disease; the only influence which it seemed to exert was to cause the immediate suspension of the coma. This was its effect also in a case in which we employed it, that of a girl seven years old, to whom we gave two drops of Lugol's solution three times a day, from the thirteenth to the twentieth day, when she died. The day before her death she seemed to improve somewhat, and we were in hopes that it had been of some service. The amelioration did not continue, however, and we are now disposed to believe that the change was one of those which often take place naturally in the disease.

*Iodide of Potassium* was recommended more than twenty years ago by Roeser (*Hufeland's Journal*, April, 1840), as a remedy of special power in this disease. It has since then been very widely employed, and there are quite a number of cases in which it is asserted that its administration was followed by successful results.

Dr. West (*op. cit.*, 4th Amer. ed., p. 97) thinks that he has seen good from its employment, "and that in one instance of what seemed to be sub-vanced tubercular hydrocephalus, under the care of my friend and former colleague, Dr. Jenner, recovery took place under its employment."

Niemeyer (*op. cit.*, vol. ii, p. 218) speaks as follows of its use: "On the strength of two successful cases, opposed, it is true, by a large number of unsuccessful ones, I recommend large doses of iodide of potassium, continued for a long time."

Dr. J. Lewis Smith (*op. cit.*, p. 145) also recommends its use throughout the entire disease, beginning as early as possible in the premonitory period.

Successful cases of its administration are also reported by Drs. Bourrouse de Lafore, Coldstream (*Edin. Med. Jour.*, Dec. 1859); and Carson (*Med. Times and Gaz.*, March 5th, 1857).

We have ourselves frequently administered it, either alone or in combination with small doses of bichloride of mercury, but have not yet been fortunate enough to arrest the progress of any case when once the second stage has been fully developed. In a few cases, however, the use of the following combination:

| | |
|---|---|
| ℞.—Potass. Iodidi, | ʒj. |
| Hydrarg. Chloridi Corrosivi, | gr. j. |
| Syr. Simp., | f℥j. |
| Aquæ, | f℥iij. |

Ft. sol. Dose, a teaspoonful three times a day at five years of age.

has seemed to delay the march of the disease, in one some weeks, and in another, the one already mentioned, it seemed to have a positive effect in promoting the absorption of the exudation upon the membranes at the base of the brain. It is improbable, also, that in *all* of the reported cases, errors of diagnosis were made, and simple meningitis taken for the tubercular form; so that there is no remedy from which so much benefit may be hoped for in this almost hopeless disease, as iodide of potassium in full doses, and it should therefore be faithfully tried whenever opportunity offers. We have been in the habit of giving it in doses of one or two grains every three or four hours, to children two years of age. It has, however, been given to the extent of a drachm in the course of a single day to children of that age. It ought to be begun with early in the case, and continued in connection with counter-irritation and cold to the head. We must remark, however, that it sometimes irritates the bowels too much, causing diarrhœa; and here the dose ought to be greatly reduced, or the remedy withdrawn.

The treatment which has just been described, is that which we have been led by our convictions as to the nature of the disease, and by our personal experience of different plans, to adopt as the most reasonable and the best. It is proper to state, however, that we have never seen it, nor any other method, of any avail after the disease has passed into the latter part of the second stage—when coma, dilatation of the pupils, marked strabismus, paralytic or convulsive phenomena, show the presence of inflammatory exudation under the membranes, and of serous effusion into the lateral ventricles, or the peculiar lesions of the substance of the brain,

relations of the child, that it has been very much aban
it had succeeded in any considerable proportion of t
have been received as a boon, however revolting to the
ourselves, in past years, blistered the nucha, the bacl
the temples in a number of cases, but have always fai
evident good from them. Within a few years it has
pustulating the whole sinciput with croton oil has beer
The last case of tuberculous meningitis we saw, occurre
here we had nearly the whole of the crown of the head
lated with the oil, but it was of no use whatever.

*Cold applications* to the head have been very much
employed them ourselves, and still use them whenever t
when their use relieves the headache or soothes the pa
fess that they have not seemed to us of much use exc
They may consist of cloths wet with cold water, of af
water, or as has been proposed by M. Guersant, of
ployed in surgery. M. Guersant prefers this mode of
any other, believing it to be the most convenient an
the child, and from its continuous action, the most effic
use of it the hair is to be shaved or closely cut, and the
a mattress without a pillow, and with its head near the
The head is then covered with compresses of soft rag,
patent lint, while under it is placed a piece of oiled sil
cloth, so arranged as to keep the thorax from being
into a gutter above to convey the water off into a vess
floor. A bucket or basin filled with fresh, cool water, is
head of the bed, and from this a syphon made of lint o
arranged as to convey a stream of water upon the com
the head. If the heat of the whole body falls so much a
lapse after the irrigation has been continued for some
of water should be stopped, and compresses, merely

heat of the skin. When there is but little heat of head, only a slight febrile movement, and the headache is not relieved by cold application, Guersant recommends the substitution of warm poultices to the scalp, in the place of irrigation or cold applications.

We have already stated that *calomel* has not succeeded in our hands, so that we have abandoned its use. We deem it right, however, to lay before the reader the opinions of others upon this point. Thus, it is highly recommended by many of the English writers on acute hydrocephalus, and is asserted to have effected cures when it has been pushed to such an extent as to produce salivation. But little dependence, however, can be placed on these assertions, as in all probability the reported recoveries occurred in cases of simple meningitis. The French writers speak of having used it in very large quantities without any success. It was given to many of the patients of MM. Rilliet and Barthez, in the quantity of from six to ten, increased to twenty grains, in twenty-four hours, in connection with frictions with mercurial ointment, of which two drachms and a half were used at first, and the quantity afterwards doubled and trebled. They state that salivation did not occur in any of the cases, though fetor of the breath and inflammation of the gums were of frequent occurrence. Calomel may be given, as has been remarked, in purgative doses, at the beginning, and for the purpose of procuring its specific effects. With the latter view the dose may be from a quarter of a grain to a grain, every hour or two hours. Mercurial inunction, in conjunction with the internal administration of the remedy, has been highly recommended by several writers as an efficient means of procuring the full effect of the drug upon the constitution. About a drachm of the ointment is to be rubbed into the insides of the arms and thighs morning and evening, and the quantity gradually increased if no effect is produced. For our part, we will merely state that we have never known calomel given in large quantities, in order to procure salivation, of the least benefit in the disease. On the contrary, we cannot but think that the violent irritation of the digestive mucous membrane which it has determined, whenever we have used it largely, and the inflamed, irritated condition of the mouth which it caused in one case, must have been a serious aggravation of the state of disease under which the constitution was laboring. Mercury is well known to be an injurious and dangerous remedy in the tubercular diseases of adults, having for its effect to increase the dyscrasia of the constitution, which already exists, and thereby to hasten the progress of the malady. Why it should have a different effect in children is difficult to understand. It may be said, to be sure, that in the disease we are considering, it is given to overcome the inflammatory element of the malady, which, for the time, constitutes the danger of the case, and also to allow the patient the chance of its beneficial operation should the disease happen to be one of simple meningitis. In support of the views just expressed, we will quote the opinion of Dr. John Abercrombie (*Diseases of the Brain and Spinal Cord*, Philad. ed., 1831, p. 173–6): "Mercury has been strongly recommended in that class of cases which terminates by hydrocephalus, but its reputation seems to stand upon very doubtful

ploy mercurial inunction as especially applicable in using
children. He advises that a drachm or more of the ointm
upon one end of a flannel roller, which is to be applied, not
around the knee; repeating the application daily. "The m
child produce the necessary friction; and the cuticle being t
cury easily enters the system." The editors of the journal
communication is made (*Braith. Retrosp. of Med.*, vol. iv.
from *Quart. Med. Rev.*, July, 1846, p. 169), state that they t
in a case of acute hydrocephalus, in which some of the mo
fatal symptoms were present, "such as very dilated pupils.
vulsions, hemiplegia, and more or less stertorous breathing
violent were the symptoms, that we considered the case p
less; but on reflecting on Sir Benjamin's method, we ordere
curial ointment to be smeared on each leg, every twelv
covered with a stocking made to tie tightly above the knees
toms soon began to abate, and by following this up with s
iodide of potass., frequently repeated (gr. i, every three or
the head symptoms vanished.

"In a second case, the same set of symptoms were app
were stopped by the same mode of treatment."

When the convulsive symptoms are violent and distressi
often be moderated by the use of a warm bath, which must
given, and by the administration of some of the *antispas*
prefer for this purpose the fluid extract of valerian, of whic
twenty drops may be exhibited every two or three hours to
dren, and a larger dose to those who are older. Bromide
has also been recommended on account of its peculiar sed
and M. Bazin (*Gaz. des Hôpitaux*, 1865) narrates a case in
doses of this remedy were successful in checking the progr
cular meningitis, in a lad who presented at the same time t

or evincing but few signs of the tubercular cachexia. When, on the contrary, it occurs in children with extensive tubercular affections of other organs, by which they are already weakened and exhausted, the treatment must of course be modified to meet the circumstances of the case. It ought to consist chiefly of cold applications, and of an early use of cod-liver oil, of iodine, or of the iodide of iron. We should recollect that experience has long since shown the weakness of our art in such cases, and for that reason avoid such a degree of interference as might possibly abridge the little span of life allowed the patient by this relentless malady.

Prophylactic Treatment.—It must be evident that the prophylactic treatment is of especial importance in a disease so little amenable to curative means as the one under consideration. When, therefore, there is reason to suspect a tendency to tubercular meningitis in a child, either from the fact that other children in the family have perished with it, or from a bad state of the general health and frequent complaints of headache, it becomes proper and necesssary to regulate both the moral and physical education with a view to its prevention. For this end the hygienic management of the child ought to be such as is best calculated to prevent the formation or development of tubercles in the constitution. During infancy, such a child should be nursed, if this be possible, by a strong, hearty woman, with an abundant flow of milk. If the mother is not possessed of these qualities, if there be, indeed, the least doubt upon the point, she ought without hesitation to give up the pleasure of nursing the child herself, and procure for it a wet-nurse of the kind described. This alone will, in all probability, often make the difference between a vigorous and fragile constitution. When the time for weaning arrives, the change ought to be made with the greatest care and circumspection. During and for some time after weaning, the diet must consist principally of milk preparations and bread, and of small quantities of light broths, or of meat very finely cut up. As the child grows older, the meals ought to be arranged at regular hours, and should consist of four in the day. The principal food must be bread and milk, well-chosen, well-cooked meats, and rice and potatoes as almost the only vegetables. After the first dentition is completed, a moderate use of ripe and wholesome fruits may be allowed, but always with care, in order to avoid injury to the digestive organs, and also so as not to mar the appetite for more wholesome and nutritious food. Coffee and tea ought to be forbidden at all times; since, as we have often observed, when the palate of a child is taught, by habit, to become accustomed to these more highly sapid substances, it is very apt to abandon the use of milk, which ought to constitute a large proportion of its food, at least up to the age of twelve or fifteen years. In no circumstances of life is the old saying, "where ignorance is bliss, it is folly to be wise," a better rule of action than in regard to the diet of our children. The child should not taste improper articles of food, so that it may escape the torment of desiring what is improper.

After diet the most important points in the treatment are air and clothing. The child should inhabit, if possible, a large, dry, well-ventilated room, which ought to be kept as cool as possible in summer, and moder-wrong in a child who shows the least evidence of a tende affections.

For our own part we are fully convinced from what ex had of the diseases of children, that by far the most cer means of preventing the development of a tubercular, or cachexia in a child, is to have it brought up in the ope some healthy village, until the epoch of puberty has pass very good plan for parents whose occupations compel the or large towns, is to have their residence a few miles in to come to town every day. Children brought up in th better chance of obtaining strong and vigorous constitu reared entirely in the close and confined dwellings and st cities.

When a child, who, from the health of its parents, or pearance, may be suspected of having any tubercular or in its system, becomes subject to frequent attacks of a less headache, and especially when such headaches are a constipated habit of body and with occasional vomitin looked upon as threatened with tubercular disease of th these circumstances we would advise, in addition to th now recommended as to diet, dress, exercise in the ope dence in the country, that it be put at once upon the use iodide of iron, and mild laxatives, and that these be p several weeks or months, until in fact the strength and ge restored and the headaches cease. When the appetite digestion is imperfect, in such a case we may use with ad the above remedies, solution of pepsine, a teaspoonful th with the meals, or tincture of nux vomica, three or four ture of syrup and compound tincture of gentian, or in elixir of cinchona three times a day. If the child is of an on with its education, this should for the time

The intelligence was perfectly natural. The child was rather dull and listless, from suffering and from weakness, but not from any want of a healthful state of the mental operations. There was no sign whatever of spasmodic or paralytic affection. In the morning the skin was cool and natural, but in the afternoon it became warm and dry, but not very hot. The pulse was 62 to 68, and though not actually irregular, it was halting or hesitating. There was occasional, but not frequent, unprovoked vomiting, and he complained often of sick stomach, even when he did not vomit. The bowels were very much constipated, and had been a good deal so for some weeks previous to his falling actually sick. There was no cough, no sore throat, and no soreness about the abdomen. The tongue was moist, soft, slightly furred, and not red nor gashed. The urinary secretion was healthy. Physical examination showed the lungs and heart to be without disease.

The treatment during the first week was small doses of calomel and rhubarb, half a grain of the former to two of the latter, given for a day, and followed by syrup of rhubarb and fluid extract of senna, until the bowels were copiously evacuated. After this the bowels were kept soluble by the administration every day, or every other day, of doses of Selzer powder, sufficient to produce the effect. Blisters were applied behind the ears. In the after-part of the day, when the head and body became heated, cooling applications were made to the head, and the feet were put into mustard-water, once, twice, or three times. Two grains of iodide of potassium were ordered to be given three times a day. The diet was to be light but nutritious. It was to consist of bread and milk and a soft-boiled egg in the morning, oysters or light meats with rice for dinner, and milk with bread in the evening. Of these he was to have any reasonable quantity that he might desire. Under this treatment he improved slowly, with occasional drawbacks for a week, when the iodide of iron was substituted for the iodide of potassium. The bowels continued very costive, requiring daily doses of the Selzer powder; the headaches diminished in frequency, duration, and severity; the pulse went up to 72 and 78, and became more free and even; the appetite had improved, but the child remained still very weak, pallid, and quite emaciated. After another week, as he continued to mend, and the stomach had become stronger, cod-liver oil was ordered in addition to the iron; a teaspoonful was to be taken three times a day in a wineglassful of table-beer. As he gained strength, the amount and kind of food was increased. He was, indeed, encouraged to eat heartily of plain and digestible substances.

He now improved gradually in health. The headaches subsided, and finally ceased; the bowels became soluble; the appetite grew hearty and strong, and all feeling of nausea disappeared; he regained his strength, flesh, and color, so that at the end of two months we saw him looking quite fat and well. The iodide of iron and cod-liver oil were, however, to be continued for a month longer. He is now (1869) a young man in very good health. He has passed several years in Germany pursuing a scientific education, and has returned lately to this country, and is about to marry.

As to the particular means likely to be of service in preventing a direction of the tubercular cachexia towards the brain, such as might produce tuberculosis of that organ, we have only to propose the course recommended by different writers, viz., to keep the head cool by not allowing it to be very warmly covered, and by keeping the hair short; to keep the extremities warm; to avoid stimulating the intellectual faculties to any considerable extent by education, until after eight or ten years of age, and to use every means to preserve the general health in a sound and pure condition. Some recommend the long-continued employment of a powerful derivative from the brain, as a small blister on the arm or a seton in the neck. We think, however, that such remedies ought not to be used unless there are positive symptoms of a tendency to cerebral disorder. The caution not to interfere much by powerful *local* applications with eruptions which nature may have thrown out upon the scalp, is, we believe, wise and prudent; though there can be no objection to the administration of suitable internal remedies with a view to their cure.

## ARTICLE II.

### SIMPLE MENINGITIS.

**Definition; Synonymes; Frequency.**—By this term is understood inflammation of the membranes of the brain, independent of tubercles of those tissues, or of other organs of the economy.

The disease was for a long time confounded with tubercular meningitis under the titles of water on the brain, dropsy of the brain, or acute hydrocephalus. It has also been called arachnitis; and more rarely phrenitis.

Its frequency is much less than that of tubercular meningitis. West (*op. cit.*, 4th Amer. ed., p. 100), states that he has seen 7 cases of simple acute meningitis, in 5 of which post-mortem examination was made and confirmed the diagnosis. Vogel (*op. cit.*, p. 359) speaks of it as being much rarer than the tubercular form, and states that it is no more frequent in children than in adults. It appears that MM. Rilliet and Barthez during their researches, met with only five cases of this disease, whilst they report thirty-three of tubercular meningitis. Bouchut states that he has met with two cases of simple meningitis to six of tubercular disease, whilst Barrier reports only four of the former in nearly thirty autopsies of meningitis. He states, however, that he has met with three cases of recovery, all of which he believes to have been instances of the simple form. Fabre and Constant met with nine cases of simple to twenty-seven of tubercular meningitis in a period of two years, at the Children's Hospital of Paris. (*Bibliothèque du Méd. Prat.*, t. vi, p. 166.)

**Causes.**—The causes of simple meningitis are not very clearly ascertained. It would appear, however, that the disease is more common in infants than older children. M. Rilliet, who published a very valuable paper on this affection (*Arch. Gen. de Méd.*, t. xii, 1846), divides it into two forms, the convulsive and phrenitic, the former of which he believes to be most common under two, and the latter between five and fifteen years of age. This author is disposed to think, from the fact that the disease is most frequent in the first and ninth years of life, that the process of dentition has something to do in its production. It appears also to be more frequent in boys than girls, and in robust than in weak constitutions. Guersant has known it to follow long-continued exposure to the sun in several instances, particularly in young infants; MM. Rilliet and Barthez report a case of the same kind, and Rilliet (*loc. cit.*) another; other causes cited by authors are injuries upon the head, such as blows, falls, and wounds. It also occurs as a consequence of extension of inflammation to the membranes of the brain, and usually from the internal ear in cases of otorrhœa.

The disease sometimes occurs in an epidemic form.

Anatomical Lesions.—The dura mater is generally much injected, and its sinuses, together with the large cerebral veins, contain coagulated or semi-coagulated blood, sometimes in large quantities. On opening the dura mater, the whole, or nearly the whole of the convex surface of both hemispheres, or in some instances of one only, are found to be covered with a yellowish or greenish-yellow layer, which consists of fluid or concrete pus, or of false membranes. These deposits exist also on the internal surfaces of the hemispheres, on the upper surfaces of the cerebellum, and often also at the base of the brain, though in some cases the latter presents none whatever. The inflammatory products are seated in the pia mater, and sometimes in the cavity of the arachnoid membrane, but in much smaller quantity than in the tissue beneath that membrane.

The *arachnoid* membrane which covers the brain seldom participates in the inflammation, but remains smooth and transparent. Its cavity, however, sometimes contains inflammatory products, which, when death occurs early in the attack, consist of a small quantity of pure pus, or of larger quantities of a turbid, yellowish serosity, consisting of serum and pus mixed together. When death has occurred later in the disease,—after five, six, or seven days,—the pus is mixed with lymph, or else true false membranes are found. The *pia mater* is observed to contain fluid or semifluid pus when death occurs before the fourth or fifth day, while in less acute cases there are patches or large layers of lymph, which sometimes dip into the anfractuosities, and give to the membrane under consideration a swelled and thickened appearance. These appearances are more marked on the superior and lateral, than on the inferior surface of the brain. Where the deposits exist the membrane presents a vivid injection, which is more marked in proportion as death has taken place earlier in the disease. The pia mater is generally easily detached from the cerebral substance, particularly when the fatal termination has occurred early. The *substance* of the brain is firm, and but slightly colored, in rapid cases. When the course of the disease has been slower, the cineritious portion is generally of a bright rose color, and the medullary

The serous membrane of the ventricles and the plexus chor signs of inflammation in some instances. They are of a brig uneven, rough, and very much softened, in children who di pale, opaque, slightly thickened, and rough, in those who d period.

The central parts of the brain often retain their firmness, b times softer than natural, or even diffluent. This softening is apt to exist in very young children, in connection with large the ventricles; though it also occurs in those who are older, a there is only slight effusion of pus or purulent serum. In case it is probably due to the macerating effect of the effusi the latter it is more likely to be owing to inflammation.

In some cases, and especially those of the epidemic form ease, the membranes of the spinal cord are found to present flammatory appearances which have been described as exis cerebral meninges. These cases are, therefore, more correctly by the name cerebro-spinal meningitis.

The other organs are healthy except in secondary cases. which so constantly exist in various other organs in tubercu meninges, are never found, according to M. Rilliet, in this f ingitis. This author believes himself entitled from his re formulate the following law of pathological anatomy: "T meningitis and meningitis of the convexity of the brain oc non-tuberculous children, whilst meningitis of the base of the out inflammation of the lining membrane of the ventricles, clusively to tuberculous children." (*Loc. cit.*, t. iii, 1846, p. 4

This law cannot, however, be adopted without exception, si already seen, when speaking of tubercular meningitis, that t a large proportion of such cases, evidences of inflammation o membrane of the ventricles.

**Symptoms.**—The following account of the symptoms of th tial, and is accompanied by violent *fever*, and sometimes by considerable quickness of *respiration*. The existence of *headache* cannot be ascertained at this early age. *Vomiting* is often absent, and the *bowels* generally continue regular in this form, though they are sometimes constipated. After a while the convulsions cease, and the child remains for the time in a state of quiet, somnolence, or coma, when they return with renewed violence. The returns of the convulsions generally take place at intervals of one or two hours or more. In the intervals between the crises the child is restless or drowsy, or in a state of partial *stupor*, attended with tremulous movements of the extremities; there is *strabismus*, *contraction of the pupils*, *trismus*, and sometimes *hemiplegia*. The skin retains its warmth, the pulse is accelerated, irregular, and unequal; the face is pale; the stools are spontaneous or easily procured by remedies. It is unusual to see the child regain its consciousness so as to recognize objects in the intervals between the convulsions, or after the appearance of coma and other cerebral symptoms. Death occurs during coma or in a violent attack of convulsions. This form seldom lasts more than four days.

Occasionally this form begins in a different manner. The convulsions, though they still predominate, do not occur until later in the disease, and the whole course of the affection is slower. Such cases begin with a violent febrile movement, lasting several days, and accompanied by acceleration or unevenness of the respiration, or by almost constant drowsiness, preceded or followed by agitation, screaming, staring expression of the eyes, and dilatation of the pupils; vomiting and constipation are sometimes present, at others absent. After a time, however, convulsions make their appearance, and the case follows the course already described. The duration of this form may be the same as that of the first, or it may last about two weeks.

The *phrenitic form* of simple meningitis generally begins suddenly with fever, which is sometimes preceded by a chill; the skin is warm and dry, and the pulse, in idiopathic cases, full and accelerated. In secondary cases the pulse has been found slow and irregular; in all it becomes irregular, small, and very rapid the day before death. Simultaneously with the fever there is frontal headache, which is often so violent as to draw cries from the child, and, according to M. Rilliet, is more severe than either in tubercular meningitis or typhoid fever. It is also more constant, and lasts generally one, two, or three days, until the appearance of restlessness, delirium, or coma. At the same time there is great sensibility to light and noise, and abundant vomiting of bilious matter. The latter symptom is one of the earliest; it generally ceases after a few days, but sometimes continues to the very end. Constipation exists in some cases, but is much less constant and more easily overcome than in the tubercular disease. The appetite is lost, and the thirst very acute. The abdomen is flattened and retracted, especially towards the end, while in secondary cases of this form, and in very young children, it retains its usual shape.

About the end of the first day, generally, or, in rare instances, after two or three days, appear various disorders of the intelligence. The first tion with the disorders of intelligence there exist also trismus, of the teeth, subsultus tendinum, partial convulsive movements, of the extremities or trunk, retraction of the head, strabismus, tion first and then dilatation of the pupils, and in some cases vio vulsions, followed by deep coma. Death sometimes occurs at thi In other instances, the disease continues longer, and other sy declare themselves. Vomiting generally ceases; constipation i the abdomen is retracted; headache is no longer complained of; continues, but the pulse becomes irregular; the respiration is un irregular, being sometimes more and at other times less frequ natural; the face is distorted and extremely pale, or there may be flush on the cheeks; the restlessness is excessive, and accompa subsultus, carphologia, or partial convulsive movements; the del first so violent as to make it necessary sometimes to hold the chil subsides into a state of coma and collapse, in which general sens obtunded, and special sensibility extinguished; the respiration stertorous, and at length asphyxia, coma, or a severe attack of sions terminates the scene.

The course of the disease is generally continuous. In very ra however, occasional remissions occur, so that the child recovers i gence for a short time, and recognizes persons around. The dura varied between a day and a half and nine days.

Diagnosis.—The convulsive form may be confounded with the or symptomatic, and with the sympathetic convulsions of childre mistake may generally be avoided by attention to the following In essential convulsions, the attacks are usually less violent, sel more than a few moments, occur from some evident cause, and recur often. When they have ceased, the child generally soon re consciousness and health, or exhibits slight drowsiness, or dera of movement for a short time only. In such cases the respiratio permanently accelerated, as in convulsive meningitis; the pulse, been increased in frequency, soon falls to the natural standard, cial sensibility remains undisturbed.

with congestion of the brain, or with the early stage of the eruptive fevers. The distinction between it and tubercular meningitis has already been considered under the head of the latter disease.

M. Rilliet is of opinion that it is sometimes impossible, in the present state of knowledge upon these points, to distinguish with certainty between simple meningitis and cerebral congestion or hemorrhage, and encephalitis. In regard to congestion of the brain, he proposes the very important question, "Whether we ought to class as meningitis the dangerous cerebral symptoms, resembling exactly those which mark the commencement of meningeal inflammation, and terminating rapidly by death or recovery?" He states that examination after death in these cases reveals neither pus nor false membranes in the arachnoid or pia mater, but simple congestion of the brain and its membranes. He deems the solution of the question to be difficult, but is himself of opinion that they ought not to be classed together. He gives the following table, which he thinks may assist in making the diagnosis:

| CONGESTION OF THE BRAIN—MODE OF INVASION. | MENINGITIS. |
|---|---|
| There occurs instantaneously profound stupor, absolute immobility and insensibility, with dilatation of the pupils; or else acute delirium, with difficulty of breathing, and with acceleration and smallness of the pulse; or in yet another class of cases with tremors or slight convulsive movements of one side of the body. Stuttering, loss of speech, stertorous respiration and pains in the arms and corresponding side of the face exist; the fingers do not retain objects which the child attempts to grasp. | In the phrenitic form the first symptom is generally headache, which is not noted in any of the cases of M. Bland (of congestion). The alterations of intelligence and motion occur early, but not before the beginning of the first or second day; whilst in congestion, the appearance of delirium or coma, of subsultus tendinum, or partial paralysis, is instantaneous, frightful, truly apoplectic, and, so far as we can ascertain, not accompanied by vomiting,—a symptom rarely absent in meningitis. |

From the invasion of variola, it is to be distinguished by attention to the contagious and epidemic nature of that malady, by the inquiry as to whether the patient has been vaccinated or has had a prior attack of that disease, by the absence of pains in the loins, in meningitis, and by a consideration of the period at which the delirium makes its appearance, which, in variola, rarely occurs before the third day. To make the diagnosis between meningitis and malignant scarlatina, we must attend chiefly to the epidemic and contagious character, to the thick coating upon the tongue, redness of the throat, elevated temperature, and nasal respiration, which exist in the latter.

PROGNOSIS.—The prognosis of simple meningitis is very grave, but much less hopeless than in the tubercular form. M. Valleix is disposed to think that most of the recoveries reported by M. Guersant were cases of sanguine congestion or effusion. M. Rilliet (*loc. cit.*), who has studied the subject more carefully than any other observer, cites several instances of recovery, but states that death is much the most frequent termination.

TREATMENT.—It must be evident, it seems to us, that but little depen-

or cups. It is customary to apply the leeches to the temples or
the ears. We may remark that MM. Rilliet and Barthez object
application of leeches to the head, and propose that they should be
rather about the anus or on the inferior extremities. The quan
blood to be drawn must depend upon the age and constitution
subject, and the violence of the attack, in some measure. It sho
ways, however, be large, as much or more, we think, than what is
sary in any other of the acute affections of childhood. In a child two
old, of good constitution, from two to four ounces would not be too
at first, and should the symptoms not moderate in six or eight ho
much more may be taken. Should these detractions of blood fail t
duce a good effect upon the dangerous symptoms, it would be p
unless there were evident and unmistakable signs of exhaustion, t
still more, either locally or generally. We are disposed to believ
in such a disease as this, bleeding is by far the most powerful re
and it is perhaps the only one which offers us any real chance of su
at least in those rapid cases in which extensive layers of pus an
membranes are found on the surface of the brain, in the pia mater,
the subarachnoid tissue, in from two days and a half to three or fou
after the commencement of the disease.

While the bleeding is being performed we should direct the pr
tion of means for the application of *cold* to the head, which const
another most efficient remedy in inflammations of the brain and its
branes. These means may consist of a bladder containing wate
pounded ice, which is perhaps the most convenient and powerf
cloths wrung out of iced or very cold water, to be constantly ren
of cold affusions upon the head, or, lastly, of irrigation as recomm
by M. Guersant, and described in the article on tubercular menin
*Purgatives* ought to be employed so as to empty the bowels thoro
and produce a decided revulsion upon the intestinal mucous meml
but not in such quantity as to occasion inflammation of that
which would be very apt to prove the case were the drastic subst
and large doses recommended by some writers used. The remedy

ing, without waiting for the operation of the internal remedies. After the purgative doses have been given, it is important to continue the mercury in smaller quantities, with the view of obtaining its specific influence upon the inflammation. The doses may consist of from a quarter of a grain to a grain every hour or two hours. Some writers also recommend very highly the use of mercurial inunction. Vogel (*op. cit.*, p. 361) states that a mercurial treatment is decidedly effectual, and adds that the only two children he has seen recover from this disease, were treated exclusively with mercury, internally and externally.

*Counter-irritants* are useful as adjuvants to the more powerful remedies already indicated. During the first day or two they should consist chiefly of sinapisms and mustard poultices, applied from time to time to the trunk and extremities. Authorities differ somewhat as to the effect of blisters, and as to the time at which they ought to be applied. M. Valleix (*loc. cit.*, t. ix, p. 187), opposes their employment in this affection as often injurious and still more frequently useless. We think the advice given by Dr. Abercrombie, as to their employment, is probably the most prudent. This is, not to apply them in the early stage, but to wait until the active symptoms of the disease have been subdued. They may be applied to the head itself, to the nucha, or to the extremities. We believe that we have seen them most useful when applied to the neck and insides of the calves of the legs. Nevertheless, there is high authority in favor of their good effects when applied upon the head itself.

M. Rilliet (*loc. cit.*) recommends a vigorous revulsion upon the scalp when the disease has followed the suppression of an eruption. He proposes with this view the employment of pustulation by croton oil, and relates a case of recovery which followed this treatment under a most unfavorable train of symptoms. To make use of it the head must be first shaved; from fifteen to twenty drops of the oil are then to be rubbed over the scalp with a glove four or six times a day. Before making the friction, the eyes of the patient must be covered with a band to prevent the introduction of any of the oil into them, as this would be apt to occasion severe ophthalmia. In the case reported by him, a considerable number of pustules were produced in twenty-four hours, and in a few more hours the eruption was general, so that the head was covered with a kind of cap of a fine yellow color.

## ARTICLE III.

### CEREBRAL CONGESTION.

We believe, from our personal observation and from the evidence of several of the highest authorities on the diseases of children, that cerebral congestion is of rare occurrence as an idiopathic and distinct affection in early life. We think that the symptoms which are detailed in this article, and which are by several writers, and especially by Dr. West, attributed

645) that they have found in children dying of different di
who had presented no cerebral symptoms, congestion preci
to what they found in others who had exhibited more or
gerous idiopathic or secondary nervous symptoms. "Some
they remark (*loc. cit.*, p. 650), "it is true, who presented us
ples of cerebral hyperæmia, had had well-marked nervous
Thus we have met with the anatomical characters of congestio
subjects who had perished with convulsions, in those whose si
been accompanied by violent delirium, and in others who, in
of scarlet fever for instance, had been seized with nervous
But, on the other hand, we have met with a nearly equal num
tients who had died under the same circumstances, but in
cineritious and medullary substances preserved their usual col
pia mater was not injected. What are we to conclude from th
Most assuredly that we ought not to attribute to cerebral hype
considerable part in the production of the symptoms." At pag
say: "The most important practical point is in fact to determi
it is possible to recognize cerebral congestion in a child by s
characteristic symptoms, and whether we ought as a conseque
scribe a particular form of treatment. We acknowledge, on
that we find it impossible to describe any symptoms peculiar t
dition, and consequently to formulate a treatment." In the
convulsions (t. ii, p. 281) they state that in some of their pat
found no traces of congestion, and add that eclampsia is so
well-known fact) connected with an anæmic state of the brain
are we to conclude from these opposite facts, if it be not that
plays but a secondary part in convulsions?" They coincide
with the authors of the *Compendium*, who suppose that the
found in patients who have died with convulsive symptoms, is
the effect and not the cause of the convulsions. They do not
ever, that a sudden congestion of the brain may produce a

The authors of the *Bibliothèque du Méd. Prat.* are of opinion that it is very rare to meet with true pathological and idiopathic congestion of the brain, either in the first or second infancy (t. vi, p. 118). M. Barrier states that primary or secondary hyperæmias are sometimes a cause of convulsions, and that such cases are the most dangerous of their kind. He also states that in rare instances congestion assumes a more menacing character, similar to that which is more frequently met with at an advanced age, meaning the apoplectic form. M. Valleix asserts (*op. cit.*, t. ix, p. 259) that "cerebral congestion is a disease almost unknown in infancy."

M. Rilliet, in the paper on simple meningitis quoted in the article on that disease, states, as his opinion, that the cases attended with dangerous cerebral symptoms, which resemble exactly those occurring at the commencement of meningeal inflammation, which terminate rapidly in death or recovery, and in which the only lesions found after death are congestion of the brain and its membranes, ought to be regarded as dependent upon congestion, though he thinks it difficult to determine positively whether they are in fact the result of that condition, or whether they are not merely the forming stage of meningitis.

Dr. Charles West, of London, whose publications upon the diseases of children are amongst the most valuable that the English press has afforded us, treats of congestion of the brain in children as a very important and frequent condition of disease. We shall chiefly follow him in our remarks upon this subject, although we have no doubt, from our own observation and from the researches of the French observers above quoted, that its importance has been much exaggerated, and that its real influence in the production of the symptoms generally ascribed to it is very imperfectly understood.

Dr. West treats of congestion of the brain under two heads, as *active* or *passive*. By the former is meant the kind of congestion occurring under the influence of a cause which greatly increases the flow of blood to the head, and to this class belong, for instance, the head symptoms which often usher in the eruptive fevers; by the latter is understood the kind depending on an impediment to the reflux of blood from the brain, to which belong for example, the convulsions which occur in a fit of hooping-cough.

Active congestions may occur during the process of dentition, or may result from exposure to the sun, or from blows upon the head; passive congestion may be the result of a mechanical impediment to the return of blood from the brain, as the pressure of an enlarged thymus, or it may be the result of enlarged and tuberculous cervical or bronchial glands pressing upon the jugular veins, or of languid circulation depending upon want of pure air, or of nourishing and sufficient food. Dr. West states that intense cerebral congestion is not a very unusual consequence of the disturbance of the circulation at the outset of the eruptive fevers. He says that convulsions and apoplectic symptoms sometimes come on suddenly in these cases, and may terminate fatally in less than twenty-four hours: after death "the brain is found loaded with blood, but all the other organs of

*always* found; and sometimes the congestion is not more ma
other diseases in which there had been no cerebral sympto
these remarks we shall pass on to the consideration of th
generally ascribed to congestion occurring under other circu
those taking place in the course of the eruptive fevers will b
under the head of those affections.

Dr. West states that cerebral congestion may come on su
very alarming symptoms, or it may be preceded for a few day
uneasiness, by a disordered state of the bowels, generally bu
consisting of constipation, and by peevishness. "The head
becomes hot, the child grows restless and fretful, and seem
by light or noise, or sudden motion, and children who are
sometimes complain of their head." Vomiting generally oc
edly, sometimes before any other symptoms, and is a very im
The fever varies greatly as to its violence, though the puls
much and permanently quickened, and if the skull be still un
anterior fontanelle is either tense and prominent, or the brai
seen to pulsate forcibly through it. The sleep is disturbe
often waking with a start, and there is often occasional twit
muscles of the face or the tendons of the wrist.

The child, Dr. West remarks, may recover from these sym
out any medical interference, or the case may become aggr
terminate in acute hydrocephalus; or again, the congestion m
and cause the following symptoms. Under the latter con
countenance becomes heavy and anxious, the indifference to
objects increases, and the child lies in a state of torpor or
from which, however, it can at first be roused to complete con
The bowels generally continue constipated, and the vomit
ceases, though it may be less frequent. The pulse is usually s
before, and often irregular in its frequency, though not i
"An attack of convulsions sometimes marks the transition fr

and perhaps a little clear fluid in the ventricles and below the arachnoid." Occasionally, however, recovery takes place, contrary to all expectation, after these symptoms have continued but slightly modified, for days or even weeks.

Acute congestion is to be *treated* like simple meningitis, with blood-letting, cathartics, calomel, cold applications to the head, baths, revulsives, low diet, and confinement to a cool, dark chamber. It is useless to repeat here, what has already been said in our remarks upon the treatment of meningitis.

In passive congestion the treatment should consist, according to Dr. West, of careful local depletion, if the case will bear it, and in strict attention to the diet and state of the bowels. He recommends mercury and chalk, to correct the bowels when they are out of order. If the case be associated with diarrhœa and bad nutrition, he recommends that extract of bark, with a few drops of sal volatile, or of the compound tincture of bark, be given two or three times a day. Farinaceous food, he remarks, is not usually well digested when nutrition is much impaired, and he recommends milk and water, or milk and water with isinglass, or veal-tea.

## ARTICLE IV.

### CEREBRAL HEMORRHAGE.

We shall consider hemorrhage of the brain under two heads, that of the substance, and that of the membranes; the former is usually designated as cerebral, and the latter as meningeal apoplexy. Both these forms of hemorrhage are of rare occurrence in childhood compared with other diseases of the brain, and with their frequency during adult life and old age. Of the two kinds, that of the meninges is the most common.

Definition; Frequency; Forms.—By cerebral apoplexy or hemorrhage is understood an effusion of blood into the substance of the brain. By meningeal apoplexy or hemorrhage is understood an effusion of blood between the dura mater and cranium, into the cavity of the arachnoid membrane, beneath the arachnoid, or in the meshes of the pia mater. Cerebral hemorrhage is a very rare affection in childhood. This is proved to be the case by the facts that MM. Rilliet and Barthez met with only eight cases in their extensive experience, and that M. Barrier saw but one in 576 cases of disease of all kinds. Meningeal apoplexy is of more frequent occurrence, since MM. Rilliet and Barthez report eighteen cases. M. Barrier met with one case of this form in the 576 cases referred to. Dr. West (*London Med. Gaz.*, June 18th, 1847, p. 1062) says he has only twice met with distinct extravasation of blood into the substance of the brain in children.

Hemorrhage into the substance of the brain occurs in two different forms: one in which the effused blood is contained in a cavity caused by

membrane. Of this form the authors just quoted report 17 cas
according to the authors of the *Bibliothèque du Méd. Prat.* (t. vi.
the effusion always occurs in this situation. That this is not in
correct, however, is proved by the case of effusion exterior to t
mater already referred to, and by the fact that it sometimes tak
beneath or in the meshes of the pia mater. The latter class of
very rare, however, in proportion to those in which the hemorrhag
within the cavity of the arachnoid. MM. Rilliet and Barthez
themselves meet with a single instance of that kind, but they qu
from other writers; and M. Valleix refers to a memoir by M.
which others are given. It appears, therefore, that in the great
of instances, the effusion takes place within the cavity of the ar
membrane.

Causes.—The causes of cerebral hemorrhage are very obscure,
so, indeed, that some writers have not attempted to ascertain them
appear to be the same in both forms of the affection. Amon
ascribed causes are the sudden disappearance of eruptions of th
observed in two cases by MM. Rilliet and Barthez, in one of wh
effect is stated to have been produced suddenly by medical tre
while in the other it followed the application of poultices to a
eruption upon the same part. This cause must, however, it appea
be regarded as purely illusory. The disease is stated by M. Lege
have followed in one case a violent fit of anger. It is said also
been produced by various causes which acted as impediments to
culation. The obstacle may be situated within or exterior to the c
To the first class belong cases in which the sinuses and large
trunks of the head have been found obstructed by coagula of bl
by the pressure of tumors, generally of a tubercular nature; to th
those in which there is intense engorgement of the superior ca
duced, as in prolonged paroxysms of hooping-cough, or in obst

In some instances the hemorrhage occurs in the healthiest and most vigorous constitutions, and cannot be accounted for in any way.

It appears that meningeal apoplexy is most frequently met with in very young children, according to MM. Rilliet and Barthez, between the ages of one and two and a half years, whilst M. Legendre did not meet with a single case after three years of age in 248 autopsies. Cerebral and ventricular hemorrhage, on the contrary, are much more common after three years of age than before, which is just the reverse of the law in regard to meningeal effusion.

ANATOMICAL LESIONS.—The description of the lesions of hemorrhage into the substance of the brain need not detain us long, for they are much the same as those observed in the adult. When the blood is effused into cavities (apoplexy in cavities), the latter are usually small in size, seldom exceeding from one to two-thirds of an inch in diameter, though in rare cases they have been found much larger. The cavity is formed by a laceration of the substance of the brain, and is filled with soft, dark coagula, or sometimes with fluid blood; the walls of the cavity consist sometimes of the substance of the brain, which may be of a rosy color and natural consistence, or yellowish and softened, while in other instances they are formed of more or less numerous points of capillary apoplexy. The capillary form of effusion occurs in the shape of a number of points, scarcely so large as the head of a small pin, and of a dark or brownish color, which contrasts strongly with that of the cerebral tissue. These points evidently consist of true coagula, which are sometimes surrounded by small yellowish areolæ. The substance of the brain around the effusion is either white, firm, and perfectly healthy, or softened, and of a whitish, reddish, or yellowish color. The capillary effusions are generally limited within a space of from a third of an inch to an inch and a half in size, but they have been found scattered over a large portion of the hemispheres.

Both forms of hemorrhage are much more common in the cerebrum than cerebellum, and occur more frequently on the left than right side. In addition to the sanguine effusion there is generally considerable congestion of the pia mater, of the venous sinuses, or of the substance of the brain itself.

In describing the lesions of meningeal apoplexy, we shall confine our remarks to the effusion which occurs into the cavity of the arachnoid, this being, as we have already remarked, by far the most frequent form of the disease.

The appearances presented by the cavity of the arachnoid into which the effusion has taken place vary greatly in different cases, according to the age of the child, the quantity of the hemorrhage, and the period of time which may have elapsed between the accident and the death of the patient. It is very uncommon to find pure liquid blood, though this has been met with. In most instances, there is a bloody serum mixed with thin, reddish coagula, contained in a soft and very delicate membrane lining the internal surface of the arachnoid. Sometimes the effusion is thin, limpid, and more or less yellowish in color, while at other times it is thick and measure between a fifth of a line and two lines, and are brownish or ish in color, and of variable consistence, according to their age. coagula may exist upon any portion of the brain, but, according to Rilliet and Barthez, are most frequently met with upon its convex su

The coagula just referred to undergo in some instances a curious ch of which we shall give a short description. In the course of time fibrinous portions of the blood are deposited upon the internal su of the cavity of the arachnoid, in the form of a new membrane. W death occurs soon after the onset of the attack, the parietal layer o arachnoid is found to be completely lined with this membraniform duction, whilst the visceral or cerebral layer is covered by it only tain points. When the case has lasted a longer time, on the cont the visceral as well as parietal layer of the arachnoid may be co with the new production, and when this happens there is formed a sac or cyst, destitute of opening, which lines the whole interior arachnoid, and contains within its cavity bloody serum and coagula. first this new membrane is reddish in color, elastic, and of a st texture than might be supposed from its apparent thinness and Its thickness is generally about a tenth of a line. At a later peri walls of the cyst become so thin and transparent, that they have mistaken for the arachnoid itself. They differ, however, from the in being rather less transparent and thin, and particularly in the ci stance of presenting numerous arborizations. When death occurs a stage, which M. Legendre (whose description we chiefly follow) call second period, or that of complete organization of the cyst, the ex surface of the latter is found to adhere intimately to the parietal p of the arachnoid membrane, by very delicate cellular tissue, thoug with so much force but that it may be detached by traction. The int portion of the new membrane, on the contrary, which is lubricated b serosity of the arachnoid tissue, is very slightly adherent to the la that membrane covering the brain.

The size of the cyst varies exceedingly. Sometimes it covers the greater part of the convex surface of one hemisphere, sometimes the whole, while in other instances it extends to the base, forming in that case a nearly complete shell for the whole brain. The quantity of fluid varies in different cases. Sometimes it amounts only to a few large spoonfuls; in others, to one or two, or eight or nine ounces: in one case observed by MM. Rilliet and Barthez there was upwards of a pint on each side, or more than a quart in all. In most instances the hemorrhage occurs into both halves of the arachnoid membrane, so that there is a cyst for each hemisphere. More rarely it occurs only on one side.

In the second stage, and when the effusion is very large, which rarely happens except in young children and prior to ossification of the fontanelles or sutures, the lesion constitutes a form of chronic external hydrocephalus, and the symptoms are such as will be detailed under the head of this latter disease. The vault of the cranium is enlarged by the unnatural prominence of the frontal and parietal bones; the sutures are more open than usual, and the anterior fontanelle is distended and protuberant. When the effusion occurs thus early in life, before complete ossification of the skull, the brain does not appear compressed or flattened, as it does when the disease occurs at a later period.

The visceral portion of the arachnoid is often thickened, opaque, and more resisting than natural. The pia mater is frequently infiltrated with a good deal of serosity, which sometimes has a gelatinous appearance. When death has occurred in the first stage of the disease, the brain usually presents signs of hyperæmia. The veins on the surface of the hemispheres are enlarged, the cortical substance is of a bright rose-gray color, and the medullary portion is dotted over with drops of blood. Sometimes the cellular substance beneath the arachnoid is slightly infiltrated with serosity, at other times not. The ventricles contain a very small quantity of fluid.

The exact anatomical cause of cerebral hemorrhage in children is still subject to some doubt. It appears probable that it usually results from intense determination of blood to the head or from extreme passive congestion, which lead to the rupture of such minute vessels as to escape notice, or possibly in some cases to the transudation of blood through the capillary walls without actual rupture. We are not aware that any careful microscopic examination has yet been made of the condition of the walls of the vessels in such cases. In some rare instances, however, as in one witnessed by M. Legendre, the effusion is the result of the rupture of a vessel of some size. In the case observed by him, death took place in twelve hours from the attack, and the left hemisphere was found covered with a layer of coagulated blood, which had escaped from a ruptured vein. (*Biblioth. du Méd. Prat.*, t. vi, p. 192.)

SYMPTOMS; DURATION.—The symptoms of *hemorrhage into the substance of the brain* in the child are, as a general rule, extremely obscure and uncertain, though in some few cases that have been observed, they were as characteristic as those which occur in adults. In obscure cases the chief symptoms that have been noticed were restlessness, delirium,

attack of general paralysis would not be by any means so
may exist in several other diseases of childhood.

In a case which came under our charge, we believe the
been one of apoplexy of this kind. A girl, two years a
apparently in the enjoyment of excellent health, was sudd
out ascertainable cause, attacked with violent general co
entire insensibility, which lasted with very slight remissio
vulsive movements, but without any return of consciousn
hours. At the end of that time the convulsions ceased en
very soon regained her consciousness, remaining merely p
guid. She was, however, completely hemiplegic on the le
she could neither rise in bed, nor turn towards the right sid
ysis diminished rapidly, but regularly, so that at the end of
could sit up in bed, and in a few weeks was perfectly wel
remained well, with the exception of rather unusual excitab
peevishness of temper, for three years, when she died of
No autopsy could be made.

The obscurity which exists in these cases will be clearly
any one who will read two examples given by Dr. Wes
1062).

With a short quotation from the work of MM. Rilliet an
shall pass on to the subject of meningeal apoplexy. These a
(*op. cit.*, t. ii, p. 54), in speaking of this affection, that "cere
have been observed to exist, but of so unusual a character,
ent from what have been assigned by writers to apoplexy, t
not lead to a diagnosis of the disease."

We shall describe the symptoms of the *meningeal form*
under two heads; first, as they present themselves in t
second, as they occur in the chronic or second stage of the

Unfortunately the symptoms of the acute or first stage
more certain and distinct than those of cerebral

pear permanent contractions of the hands and feet, which are followed by attacks of tonic or clonic convulsions, during which sensibility and intelligence are abolished. Between the attacks of convulsions there is somnolence, which, though slight at first, becomes more marked as the case goes on. The attacks of convulsion become more and more frequent as the case progresses, until at last they are nearly constant. The tonic convulsions affect the limbs and trunk both, but particularly the former, whilst the clonic spasms occupy sometimes one side of the body, sometimes the upper extremity alone, and at other times the whole body, but even then are usually stronger on one side than on the other. Paralysis is rarely noticed in the disease; it occurred only in one out of nine cases observed by M. Legendre, and in one out of seventeen observed by MM. Rilliet and Barthez.

Dr. West remarks (p. 1061): "The absence of paralytic symptoms, however, is not the sole cause of the obscurity of these cases, but the indications of cerebral disturbance, by which they are attended, vary greatly in kind as in degree. The sudden occurrence of violent convulsions and their frequent return, alternating with spasmodic contraction of the fingers and toes in the intervals, appear to be the most frequent indications of the effusion of blood upon the surface of the brain. I need not say, however, that such symptoms, taken alone, would by no means justify you in inferring that its effusion had taken place." Dr. West adverts particularly to the fact that apoplexy in the child is especially apt to occur in those who are weakly and feeble, and gives to this form of the disease the appellation of the cachectic form of cerebral hemorrhage.

The chronic form presents most of the symptoms which exist in acquired chronic hydrocephalus from serous effusion into the ventricles. The cranium is very large in proportion to the face; the sutures are not ossified; there is strabismus, with dilatation of the pupils; the sense of sight is generally but not always retained; the face loses its expression; if the child was old enough at the moment of the attack to show signs of intelligence, the latter are found to diminish rather than increase, and sometimes they are lost entirely, as the size of the head augments; and the child is apt to utter loud cries, particularly during the night. The cutaneous sensibility is in general neither lost nor diminished. The power of motion usually remains, though it was entirely lost in one case. The appetite and thirst persist.

The *duration* of cerebral apoplexy is very irregular. In one case quoted by MM. Rilliet and Barthez, it was a quarter of an hour; in another an hour; in a third forty-eight days; and in one reported by M. Valleix, in a very young infant, recovery was nearly perfect in a little less than two months, when the child was seized with pneumonia and died.

The duration of meningeal apoplexy is also irregular. According to M. Legendre, all the recent cases seen by him in the Children's Hospital died in from eight to twelve days, apparently rather from intercurrent diseases than from the primary affection itself, whilst cases occurring in subjects placed in better hygienic conditions, and not attacked with intercurrent affections, passed into the second or hydrocephalic stage of

The diagnosis of meningeal hemorrhage is also very often ex difficult. Not unfrequently it occurs in the course of other disea is then entirely latent. In acute, primary cases, the most importa distinctive symptoms are the early age of the subjects, between three years generally; the violent fever from the commencement, by full, frequent, and *regular* pulse; the absence of constipation; quency of the convulsive attacks, and particularly the perman traction with rigidity of the feet and hands.

The diagnosis between the form of hydrocephalus which follows geal apoplexy, and ventricular serous hydrocephalus, is exceedin scure. The only circumstance which seems to have any real valu MM. Rilliet and Barthez state that they have never known a chil years old, or younger, to die of ventricular serous hydrocephal tumors, whether tubercular or not, of the brain; in all such cases t sion has been the result of a hemorrhage.

**PROGNOSIS.**—The prognosis of both forms of the disease is very It is impossible, however, to ascertain the prognosis with any ce so long as the symptomatology of the two affections is so obscure have found it to be. That cerebral hemorrhage is susceptible o however, is proved by the case reported by M. Valleix, already r to, in which the child had nearly recovered, when it was seiz another disease which destroyed it. Recovery from meningeal ap is certainly extremely rare; we believe, however, that we have m one case in which this affection terminated favorably.

**TREATMENT.**—The treatment must depend on the diagnosis a special character of the symptoms in each case. In a sudden and attack, occurring in a strong and hearty child, in which the symp congestion of the brain are strongly marked, and where we are n certain that actual hemorrhage has taken place, we should imme resort to a general or local bloodletting. It was formerly custom employ venesection in all such cases, but we beli or meningeal apoplexy, depletion in any form is entirely contraindicated; since, as has already been stated, the effusion of blood occurs frequently in feeble and weakly children, and either in the course of some acute or chronic disease, or as a consequence of previous diseases which have exhausted the forces of the constitution and induced a state of dyscrasia and diffluence of the blood. In such cases as these we must depend upon the use of rest, cold applications, purgatives, and counter-irritants as recommended below.

Cold applications should be immediately made to the head, either by wet cloths, the ice bladder, or by cold affusion. At the same time, or as early as possible after the invasion, a dose of some purgative medicine must be given. The best is calomel, either alone or combined with jalap or rhubarb. If given alone, it ought to be followed in an hour or two by castor oil, infusion of senna and manna, salts, magnesia, or some active cathartic. When the symptoms are very urgent, it is well to open the bowels still more speedily by a purgative enema.

Counter-irritants are always useful adjuvants to the remedies already mentioned. They should consist at first of mustard plasters applied to the extremities, and shifted from place to place. When the symptoms do not yield after proper depletion and the use of sinapisms for some hours, it is well to apply blisters to the calves of the legs, and to the nape of the neck.

The diet must be very strict, and should consist only of barley or arrowroot water, for a few days.

The temperature of the room should be kept cool; and the child should be placed with the head and trunk somewhat elevated, and kept profoundly quiet.

For the paralysis which follows apoplexy in children, we believe that the most important, and indeed the only treatment necessary, is attention to the general health of the patient, in order to give to nature time and opportunity to effect the absorption of the clot which has been thrown out into the substance of the brain, or into the cavity of the arachnoid membrane. This process may possibly however be aided and hastened by the prolonged administration of iodide of potassium. In cases of meningeal apoplexy, when the disease assumes the chronic form, occasioning the kind of hydrocephalus we have described, there is little more to be done than to attend to the general health of the child, and to endeavor to promote absorption of the fluid by the internal administration of diuretics, and the preparations of iodine. It has been proposed also to get rid of the fluid by tapping, as has been done in congenital hydrocephalus, and it is indeed in cases of the form we are now considering, when the fluid is entirely external to the brain, and where no malformation or organic disease of the brain exists, that this operation has been found most successful. (See treatment of chronic hydrocephalus.)

The names *internal* and *external* have also been applied to it,
ance with the position of the fluid: the former being given to t
where the ventricles are the seat of the morbid collection, and th
dicating that the fluid has accumulated in the cavity of the arac
consequently surrounds the exterior of the brain. Chronic hydr
may either be *congenital* or *acquired*, the latter variety prese
most interest in a practical point of view, since congenital h
alus is usually associated with some malformation of the brain w
ders extra-uterine life almost impossible.

In either form it is a rare disease in Philadelphia, so tha
opportunities are afforded for studying either its pathology or t

MORBID APPEARANCES.—There are indeed few diseases in whi
more importance to correctly establish the exact nature of th
process and the resulting lesion, since, as we shall see in a late
this discussion, questions of the utmost practical value hinge
determination.

*Internal Hydrocephalus.*—In this condition the amount o
often very large, and varies from half a pint or a pint, to even a
a gallon. Trousseau mentions a case where the fluid weighed 3
and Frank one in which it weighed 50 pounds. The formati
accumulation being gradual, the cavities of the brain accommod
selves to it, the ventricles become distended, and the communic
tween their cavities are all enlarged; and occasionally the septum
is perforated. This distension is usually most marked in the la
tricles. The hemispheres of the brain yield to the pressure of th
ing collection in the ventricles; their convolutions are unfolded
tened, so that the interval between them is only marked by
shallow groove, and the hemispheres are so thinned out as to for
not exceeding a few lines in thickness. It is not unusual, howe
when the distension of the brain has proceeded to this extrem
to be able to trace the cineritious and white layers, preserving the

those cases where no mechanical obstruction to the circulation exists, such as a tubercular tumor pressing upon the sinuses of the brain, we should look for the cause of the serous accumulation in a morbid state of the lining membrane of the ventricles. This view is fully confirmed by the study of fatal cases of internal hydrocephalus, since in many cases this membrane is found much thickened, and either softened or roughened and granular. The granular condition of the membrane presents many degrees: in some cases it is merely a slight irregularity of the surface, while in others there is an unevenness as marked as that of shagreen, or even a formation of granules, which, at times, measure one-third of an inch in diameter, or even become distinctly pedunculated.

Occasionally, a false membrane is found lining one or both ventricles, as the result of the chronic inflammation of the lining membrane of these cavities.

Even when the symptoms of hydrocephalus have not appeared until some time after birth, the brain may be found to present positive evidences of congenital malformation, in the retarded development of some of the structures at its base.

The veins of Galen and sinuses of the dura mater are usually found in a healthy state, with their calibres quite free; a fact which is of importance in considering the mode of production of internal hydrocephalus.

In *external* hydrocephalus, the collection of fluid occurs in the sac of the arachnoid, or in a pseudo-cyst resulting from the transformation of a blood-clot, as described in our remarks on meningeal apoplexy: the brain is separated from the cranial vault and compressed against the base of the skull, as the lung is forced back against the spinal column by the fluid of hydrothorax.

The superior cerebral veins, passing from the surface of the brain to the longitudinal sinus, traverse the fluid, and at times are so much stretched as to raise the surface of the brain into points.

Excepting in cases, however, where the disease is congenital and coincident with some original malformation of the brain, there is no absolute diminution in the size of this organ.

The character of the fluid varies considerably in different cases, and probably depends to a great extent upon the cause.

In an analysis by Spengler of the fluid evacuated in a case of hydrocephalus by puncture, the fluid was clear and colorless; specific gravity 1010, of acid reaction, and contained no albumen. It also contained chlorides and phosphates of soda and potassa, but no sulphates. It appears, therefore, in such cases as this, that the fluid is not the result of inflammation, but rather due to a passive dropsy. It is, we believe, especially in cases of external hydrocephalus, where the fluid results from the transformation of a sanguineous effusion, that it possesses these characters.

On the other hand, the fluid frequently contains a large amount of organic matter, and closely resembles the effusion in pleurisy or pericarditis. Thus, in a case reported by Battersby, which was tapped eight times, the fluid always contained varying, and sometimes very large, proportions of albumen.

*Causes of Internal Hydrocephalus.*—The opinions of the thorities and most experienced observers still differ widely important point.

We have alluded to the fact that not unfrequently the bra to present evidences of congenital malformation, and this fact the opinion that internal hydrocephalus is almost invariably the arrested development of the brain.

Rilliet and Barthez place the effusion in this affection in the passive dropsies, and express their belief that most frequently of internal hydrocephalus is to be found in compression of the Galen or ventricular veins, caused by the development of a tu cranial cavity, and usually in the lobes of the cerebrum.

The unfavorable influence which either of these views would the prognosis and treatment of this disease, is of course evident.

On the other hand, however, the opinion is advanced that the point of internal hydrocephalus is, in fact, a morbid condition lining membrane of the ventricles.

We have briefly described the appearances of this membra have now been observed in numerous well-authenticated cases of hydrocephalus, and which plainly indicate the pre-existence of inflammation, so that we are led to believe that in a certain cases, at least, the effusion is due to a slow inflammatory action lining membrane of the ventricles. Those cases in which these ances have been found associated with retarded development of the may be readily explained upon the supposition that the inflamm been excited at a more or less advanced period of intra-uterine that the resulting effusion has so compressed the structures at the of the brain as to prevent their normal development. We may many eminent authorities, as Trousseau, now adhere to this view.

In cases, however, where the effusion into the ventricles depends the development of a tumor in the cranial cavity, the usually be found to occupy the cerebral lobes in such a manner compress the veins of Galen, which pass along the under surface corpus callosum, and are indeed the only true ventricular veins.

The causes of *external hydrocephalus* are perhaps less obscure uncertain than those of the internal form.

In some cases, the effusion in the sac of the arachnoid is evide to a rupture of some portion of a brain distended by accumula fluid in the ventricles, and hence is merely a sequel of internal cephalus.

According to the able investigations of Legendre, and Rilliet thez, one of the most frequent causes of external hydrocephalus orrhage into the arachnoid space; the effused blood undergoing which result in the presence of large quantities of clear fluid, as at length in our remarks on meningeal apoplexy. We have all the fact that in many cases of external hydrocephalus the dimin size of the brain is comparative rather than real; but there are where this form of the disease is found associated with malforma the brain, which appears as a small, misshapen mass, pressed against the anterior part of the base of the skull. In such cases, it appears as though the fluid were poured out to fill up the vacuum between the skull and atrophied brain. It is also possible that these conditions may be produced by the occurrence of hemorrhage into the arachnoid space during intra-uterine life, and before the brain had attained its normal development.

Symptoms; Physical Appearance.—The unusual size of the head is one of the most striking symptoms of hydrocephalus. In many cases associated with atrophy or retarded development of the bones of the face and the rest of the body, this enlargement appears even more monstrous than it in reality is. The diameters of the cranium are, however, very much enlarged; cases being on record in which at the age of a few weeks, the circumference of the head has been twenty-three inches, or even more. The increase in the size of the head is not however invariably the earliest sign of the disease, being frequently preceded by marked symptoms of nervous disturbance, or of impaired nutrition.

The bones of the cranial vault which contribute to this enlargement are the frontal, the parietals, the occipital, and the squamous portions of the temporals. When the disease makes its appearance before the ossification of the sutures and fontanelles has been completed, the gradual increase of the fluid separates these bones more and more widely. The occipital bone thus is pushed backwards, the parietals outwards and backwards, the frontal upwards and forwards. The increase in the size of the head is thus effected by the widening of the sagittal and coronal sutures, and by enlargement of the anterior fontanelle.

The displacement of the frontal bone gives rise to a marked prominence of the forehead, which overhangs the diminutive features: while at the same time the pressure of the fluid depresses its orbital plate into an oblique position, contracts the orbital space, and gives rise to the characteristic appearance of the eye, the globe being prominent but directed downwards so as to be buried beneath the lower eyelid, which conceals almost the entire cornea.

The membrane which covers in the enlarged sutures is often distended and prominent, or remains on the normal level. A distinct sense of fluctuation is readily obtained by palpating one of these spaces, and in some cases, principally in young infants, and where the collection is very large, the head is absolutely translucent. When life is prolonged, and the disease arrested, the ossification of the cranial vault is effected by the development of numerous supernumerary bones or ossa triquetra in the membranous spaces. These little bones are consequently found in the largest numbers in the coronal and sagittal sutures, where the deficiency is greatest and most wide. When, on the other hand, the disease does not begin until the sutures have united and the fontanelles ossified, it is rare for the head to attain any very large size. In a few cases, however, occurring in children of even nine years of age, the sutures have reopened under the continuous pressure, and the bones have been found separated as much as half an inch.

sionally slight, consisting merely in an unnatural expression,
tion of the eyes or strabismus: or, on the other hand, there
tacks of convulsions frequently repeated.

These symptoms speedily become associated with enlarge
head and the characteristic alteration of physiognomy. Wh
case is strictly acquired, the early symptoms are even more
one set of cases they are those of hemorrhage into the arach
other the evidences of inflammation of the serous lining of the
of more or less acute character, are present; whilst in numero
only symptoms which precede the enlargement of the head a
failing nutrition.

Usually the aspect of children suffering with this affection
or they may even present a certain unnatural gravity and ap
pression.

*Cerebral Symptoms.*—At times the intelligence of the ch
perhaps poorly developed, remains intact, and there is no mark
disturbance.

In other cases, however, the advance of the disease is atten
gradual failure of the intelligence, and impairment of the spe
and especially of vision.

In addition to the displacement of the globes of the eyes
tions in the pupils already mentioned, the accumulation of fl
causes obstruction to the return of venous blood through the
that even at an early stage, ophthalmoscopic examination sho
changes in the fundus of the eyes. These consist in increase i
ber and size of the veins of the retina, with later serous inf
even atrophy of the optic papilla.

The nervous symptoms are at times much more marked; and
be frequently recurring convulsive attacks, or, as West menti
seen in several cases, spasmodic attacks of difficult breath
crowing sound in inspiration (laryngismus stridulus).

According to Rilliet and Barthez, the common sensibility

In one case of MM. Rilliet and Barthez, the development of acute pain coincided with the ossification of the fontanelles.

The *general condition* of children suffering with chronic hydrocephalus varies greatly.

In some cases they preserve their appetite and digestion, and appear well-nourished and strong to a late period in the attack; but more frequently they present marked evidences of impairment of nutrition.

The appetite may indeed remain, but the child loses both flesh and strength; the bowels are irregular, usually constipated, but alternating with temporary attacks of diarrhœa.

In the majority of cases, perhaps, these symptoms are not sufficiently pronounced to establish the character of the attack, until the increasing size of the head becomes manifest, and the child acquires the distinctive physiognomy of hydrocephalus. Even after marked enlargement of the head has occurred, however, the advance of the case is far from being uniform. In almost every instance there are pauses of the most variable frequency and duration, during which the child seems free from pain, improves in general condition, and the development of the head is temporarily arrested.

Death is frequently directly induced by some intercurrent affection, wholly unconnected with the disease of the brain; while, in other cases, it immediately follows a violent attack of convulsions, or is preceded by symptoms of an acute exacerbation of the cerebral disorder. In some cases, also, the patients sink into a condition of atrophy, and die worn out by the protracted suffering and malnutrition.

DIAGNOSIS.—During the early stage of the disorder, if the nervous symptoms are slight, consisting merely in occasional attacks of heat of the head, attended with pulsation or tension of the anterior fontanelle, and restlessness and crying, the diagnosis must remain uncertain. After the enlargement of the head has progressed to any considerable degree, the expression of the little patient, taken in conjunction with the other symptoms, is usually perfectly characteristic and conclusive.

The morbid condition with which it is most likely to be confounded, is rickets of the skull. In fact, in some cases, the enlargement of the head, which results from these two affections, is quite identical. Usually, however, this is not the case; and the hypertrophy of the rachitic bones takes place irregularly, so that the skull acquires a square instead of a rounded form; the orbital plates of the frontal bones are not displaced; so that, although the forehead may be large and overhanging, the axes of the eyes are not disturbed; the fontanelles are not widely open, prominent, or distended; and, finally, of course fluctuation on palpation is never present. In addition to this, the evidences of rickets in other portions of the body, and the peculiar symptoms of that affection, as detailed in the article devoted to its consideration, nearly always enable the diagnosis to be readily made.

We have already mentioned the changes which ophthalmoscopic examination shows in the retina in this disease, and as similar examination reveals no lesion whatever in cases of rachitic enlargement of the head, definite value to it.

The only other pathological condition with which chror alus is apt to be confounded, is hypertrophy of the brain rare affection, due to an increase of the interstitial conne the brain, the so-called neuroglia.

In hypertrophy of the brain, however, the symptoms d appear so early as in chronic hydrocephalus, nor is the cer ance so marked as in the latter affection. The enlargemen also, which is the most characteristic feature of both con so great in hypertrophy of the brain, and, instead of bein assuming a rounded form as in hydrocephalus, occurs es occiput. There is, further, no depression of the orbital frontal bones in hypertrophy of the brain, so that the ax are not disturbed, and the globes are not displaced in the already described as so characteristic of hydrocephalus.

Finally, the sutures are not so widely open, nor the fon and prominent as in hydrocephalus; and, of course, the fluc can be detected on palpation in some cases of this latter di present.

Prognosis.—Chronic hydrocephalus still ranks among t diseases; so much so that Rilliet and Barthez—who, howe its production usually to the presence of a tumor in the b their belief that it is invariably fatal. Indeed, it must be l that in many cases treatment must necessarily fail from th of some extensive congenital malformation of the brain. W pect the presence of this complication when there is seriou of the nervous system, such as paralysis, or frequent an causeless convulsions. Unfortunately, however, these hopel not always be distinguished.

The prognosis in cases of external hydrocephalus, espec acute origin, is less unfavorable than when the treatment must prove unavailing, from the serious organic disease of the brain which accompanies it. Under any circumstances, however, the nature of the treatment and its efficiency will be much influenced by the early stage at which it is instituted.

In regard to the utility of various special remedies, also, there is the greatest diversity of opinion; and, indeed, there is no plan of treatment which possesses so much evidence in its favor as that originally proposed by Professor Gölis, of Vienna.

If the disease be in its incipience, and the constitution and hereditary tendencies of the child free from taint, this distinguished physician recommends that the head should be shaved, and one or two drachms of dilute mild mercurial ointment rubbed daily into its scalp. While this treatment is being carried out, the head should be constantly protected by a flannel cap. At the same time, calomel should be given in doses of one-sixth to one-fourth gr. twice daily, unless it irritate the bowels, when the inunction alone should be continued.

If after pursuing this treatment, conjoined with the most careful attention to diet and all hygienic precautions, for five or six weeks, there is marked improvement in the condition of the child, the mercurials may be gradually discontinued.

The iodide of potassium has been highly recommended as a substitute for the mercurials above-mentioned, and several cases of apparent recovery under its use are on record. It should be given in large doses, and for a considerable length of time. Trousseau, who recommends its use, joins to its internal administration the external application to the head of lotions containing iodine.

Should the disease remain uninfluenced at the end of this time, it is proper to add to the treatment diuretics and counter-irritants, in the form of issues in the back of the neck, which may be kept open for several weeks. Dr. West recommends the frequent application of blisters as a substitute for the use of issues.

During the employment of this or any other mode of treatment, it will be occasionally necessary to have recourse to antiphlogistic remedies, to subdue the exacerbations of heat and restlessness which occur more or less frequently, and threaten the development of an acute inflammatory condition. Nor should we fail to pay attention to the proper performance of all the functions; to the maintenance of the appetite and digestion by the use of tonics; and in case of the existence of a scrofulous diathesis, to the administration of cod-liver oil, iodide of iron, &c.

When, despite the most careful employment of well-directed measures, the disease is clearly advancing, it is worse than useless to persist in any plan of treatment which annoys or absolutely pains the doomed child; our only endeavor should then be to subdue any intercurrent disorder which might hasten the fatal result.

More than twenty-five years ago, the use of compression of the head, to prevent its yielding to the accumulating fluid, was urged by Barnard, and experience has shown it to be a valuable adjunct to other treatment, though it is inapplicable while any acute symptoms are present, and

strips being turned up over the firs
strip, and secured by the succeeding turns.

It becomes necessary to loosen these strips instantly, if a
of compression of the brain develop themselves, since th
pressure of the accumulating fluid may produce irreparable
base of the brain, or even, as happened to M. Trousseau
ethmoidal bone from its connections.

The unfavorable results of all strictly medicinal treatme
physicians, at an early date, to resort to active surgical in
chronic hydrocephalus, by puncturing the cranium and ev
fluid.

The operation should be performed with a delicate trocbar
the puncture being made in the coronal suture, about an inc
and a half from the longitudinal sinus,—and in a majority
evil consequences appear to follow the operation itself. Mu
of opinion still exists, however, as to its curative influence.
analysis of 56 reported cases in which this operation had bee
Dr. West came to the conclusion that in only 4 had a per
been effected. Other successful cases have been since repor
the operation must be recognized as at least a justifiable one.

The circumstances favorable to its performance are, whe
cephalus is external; or when internal, is due to previous i
of the lining membrane of the ventricles; when there is n
believe that the disease is congenital, and attended with
velopment of the brain; when, though the head may be ver
increasing in size, the cerebral functions are not seriously im
finally, when the nutrition of the child is still good.

Until, however, the treatment previously recommended ha
fully tried, and unless the disease be evidently advancing,
this operation would be incurring grave risks with but slight
success.

Brainerd of Chicago has recently

from fʒi to f℥i, may be injected; the strength of the solution and the amount injected being increased at subsequent punctures.

In one of his cases, twenty-one injections were practised in the course of seven months.

Injections of this strength are usually followed by no symptoms of inflammation whatever; and this exemption has led to the employment of much stronger solutions.

Thus Dr. Tournesko, of Bucharest (quoted by Bouchut), injected fʒiij tr. iodine in fʒv distilled water, immediately after having drawn off by puncture f℥xxiv of serum. The operation was followed by slight febrile excitement; but at the expiration of fifteen days the child seemed in excellent health, the circumference of the head having diminished from 56½ to 43 centimetres.

## ARTICLE VI.

### GENERAL CONVULSIONS, OR ECLAMPSIA.

GENERAL REMARKS.—The word convulsions is a generic term applied to different forms of spasmodic disease, very dissimilar from each other in many of their characters.

Writers make different classifications of convulsions according to their peculiar notions in regard to the nature and causes of these disorders. The best division is, it seems to us, that adopted by most French writers, who arrange them by their supposed causes, making three classes, *idiopathic*, *protopathic* or *essential*, *sympathetic* or *deuteropathic*, and *symptomatic* convulsions. The first two classes are unaccompanied by appreciable lesions of the nervous centres, while the third is called symptomatic, because it includes cases of convulsions which are the sign or symptom of an appreciable lesion of the cerebro-spinal axis, as for instance, those which occur in the course of meningitis, tubercular disease, hydrocephalus, apoplexy, &c. In idiopathic or essential convulsions, the cause of the attack acts directly upon the nervous centres, while in those to which the term sympathetic is applied, the cause lies in the influence or effect upon the brain or spinal marrow of disease of some other organ; to the latter class belong the convulsions which occur in the course of pneumonia, bronchitis, the eruptive fevers, &c.

We shall not pretend to give an accurate account of symptomatic convulsions in this article, as they have already been treated of under the head of the different organic diseases of the brain in the course of which they occur. We shall refer to them in the present article only so far as may be necessary to elucidate the pathology, diagnosis, prognosis, and treatment, of idiopathic and sympathetic convulsions.

There is a form of eclampsia occurring in children, which we shall describe separately, as it differs in many of its characters from ordinary convulsions. This is the disease known by the names of spasm of the

plies, the entire system of voluntary muscles is usually
as will be described hereafter, the attack may be a compl
one of eclampsia, and yet the convulsive movements be
extent to a single group of muscles, or even a single mu

The only synonymes which it is necessary to mentic
*puerilis*, *insultus epilepticus*, and *eclampsia*. The latter
is, we believe, preferable to any other, and we would gla
instead of convulsions, which is too general a term to e
of disease under consideration.

The frequency of eclampsia is very great. During the
1844 to 1848 inclusive, 1729 children under fifteen years
this city of convulsions; whilst, during the same time,
fantile cholera, 1060 of marasmus, 1041 of dropsy of the
of pneumonia, showing that eclampsia was the cause of
of deaths than any other of the diseases just mentione
recollected, however, that a very large number of these
yond doubt, to have been returned under other titles, as
must have been a mere result of organic disease of the
axis, and of other acute local or general diseases.

Predisposing Causes.—Essential and sympathetic
much the most frequent before the age of seven years, w
also in regard to symptomatic convulsions, though the la
after the age mentioned. Of 91 cases of convulsions th
with, in which the age was noted, 19 occurred in the first
second, 20 in the third and fourth, 23 between the fourth
3 between the ninth and thirteenth years of life. Dr. W
42) states that according to the Fifth and Eighth Report
trar-General, the deaths from diseases of the nervous sy
tropolis, under one year of age, bore a proportion of 30.5
deaths from all causes; from the first to the third year,
was 18.5 per cent.; from the third to the fifth year it was
from the fifth to the tenth year, it was 15.1 per cent.;
tenth to the fifteenth year, it was only 10.6 per cent., and

he fifth and tenth years, it was 9.9 per cent.; while between the tenth nd fifteenth years, it had fallen to 2.4 per cent.; and above fifteen years, t was but 0.8 per cent.

Dr. West ascribes the great frequency of convulsions in early life to the predominance of the spinal over the cerebral system, and to the imperfect development of the brain.

It is generally stated that convulsions are more common in girls than boys. MM. Rilliet and Barthez found this to be the case in their private practice, whilst in the hospital, sympathetic and symptomatic convulsions were most frequent in boys. According to our experience, they have been almost equally frequent in the two sexes, since of 92 cases that we have seen in which the sex was recorded, 47 occurred in boys and 45 in girls.

It has been generally supposed that a delicate and nervous constitution is a powerful predisposing cause to convulsive attacks. This has been denied, however, by several recent writers, whose observation is very careful and accurate. We are disposed to believe that it is not so much a feeble or delicate constitution that predisposes to convulsions, as it is one characterized by a highly susceptible, irritable, and nervous temperament, which often exists, in our opinion, in connection with a healthy and vigorous physical organization. Of 96 children in whom we have seen convulsive attacks, these occurred more than once in 13. Of the 13, nine presented every appearance of strong and vigorous health, with the exception that when laboring under any kind of sickness, as dentition, indigestion, the fever accompanying simple angina, in two the invasion of measles, and in one that of erysipelas, they immediately became extremely restless and irritable, or heavy and drowsy, and at a very early period, and sometimes with very little warning, were seized with convulsions. In one, a well-developed infant in its first year, the convulsions occurred every month or six weeks, without any appreciable cause. Three of the 13 were delicate: one was puny and feeble until after the completion of the first dentition, when it grew strong and hearty; one had had an apoplectic attack when an infant, which had caused partial loss of power of one side; and the third was very weak at birth, then grew stronger, and died in its second year of hydrocephalus following scarlet fever. The number of convulsions varied in the different subjects. In 1 there were five different attacks, in another four, in 4 there were three, and in 5, two. In two the attacks were very numerous, recurring frequently, and from very slight causes, or without any appreciable cause. They all recovered but two, and are still living. Of the 11 now living at various ages, all but one are free from anything like epilepsy, and that one, though liable during three years, to attacks of an epileptiform character, became gradually less and less subject to the seizures, and has now been for several years perfectly well in all respects.

We have another patient, a boy, whose case is not included amongst the above, now five years old, who has had ten different attacks of convulsions. These attacks were all produced by some disturbance of his health. Several of them have occurred at the outset of a febrile reaction caused by a patient, likewise not included amongst the above, old, has also had frequent attacks, but as they a always coincident with the fever of catarrh, or dige one occasion that of measles, and as between the excellent, there is but little reason to fear epilepsy.

It is generally believed that the predisposition tc times hereditary. We have remarked in regard to t children in the same family sometimes suffer from the nervous temperament to which we alluded abo instances to have been inherited by the child from i

In one family that we attend, out of six childr had attacks of convulsions: one of these children ha that was at the age of ten years, and was caused b occurring during convalescence from pneumonia. T had each several attacks, occasioned always by the sulting from some of the numerous disorders of infan has there been any reason to suppose that the attac epilepsy.

Some very interesting evidence confirmatory of t been furnished by Dr. Robert P. Harris, of this cit before the Philadelphia Obstetrical Society (see *A* vol. ii, No. 2, August, 1869).

His record embraces 38 cases of eclampsia, 37 of families, in which, collectively, there were 55 chil enough after birth to prove their liability or exem too early to determine whether they were subject t

All of the individuals included in the statistics the first, second, or third generations, of two pairs present rising generation (the second) there are 3 of whom has as yet married; twenty of the 31 have

The *exciting causes* of convulsions are exceedingl

gh, pneumonia, catarrh, scarlatina, measles, violent fever from any
se, dentition, and indigestion.

f 96 cases of convulsions, of which we have preserved notes, we have
arded only 4 as essential, while 70 were sympathetic, and 22 symp-
atic. Of the 4 essential cases, we could not detect the exciting cause
any. Of the 70 sympathetic cases, it was scarlet fever in 12; pertussis
9; indigestion in 13; pneumonia in 3; the fever of simple angina in 6;
lera infantum and bronchitis, each 3; dysentery, 4; measles and den-
ion, each 6; enteritis, the fever and irritation caused by a burn upon
back, and the onset of erysipelas, each 1; an overdose of castor-oil
vi) given to a young child with a slight cholera, 1; and lastly, fecal
cumulations in the large intestine, 1.

SYMPTOMS.—*Prodromic Symptoms.*—It has been asserted by some
iters that most attacks of convulsions in children are preceded by pro-
omic symptoms, which indicate to the experienced eye their approach.
his does not agree exactly with our own experience, at least in regard
the essential and sympathetic forms, since of the cases of the former
riety, well-marked prodromes did not occur in any, and of 64 cases of
e latter, in which the early symptoms were noted, strongly-marked pre-
rsory phenomena occurred only in 8. We do not mean to say that
ere were no symptoms in the other 56 cases, which might have indicated
an experienced eye the probability of an approaching attack of convul-
ons, but merely that there were none that were strikingly characteristic,
one which pointed out clearly and decisively that such a crisis was
lose at hand. In many of the 56, there were symptoms that might be
egarded as indicating, with various degrees of probability, the approach
f the convulsive seizure; but, inasmuch as they were such as constantly
xist in children not predisposed by temperament or constitution to
clampsia, without the development of the disease, they scarcely deserve
o be called precursory symptoms.

The precursory symptoms of idiopathic and sympathetic convulsions
re, therefore, difficult to describe because of their variable and uncertain
haracter. They consist in general, however, of whatever indicates a
ighly disordered condition of the nervous system. The most marked
ymptoms are unusual drowsiness, excessive irritability, a peculiar physi-
gnomical expression, general tremors, and the drawing of the thumbs
nto the palms of the hands, or rigid flexion of the toes. The drowsiness
which precedes an attack of eclampsia, is almost always accompanied with
ome restlessness. The sleep is light and easily disturbed; the child
noves and turns, or starts and moans; often it seems to have frightful
lreams, and will scream out or wake suddenly bewildered and terrified,
and when roused is generally exceedingly irritable, crying violently or
fretting at the slightest contrariety, or without cause. The face, and particularly the eyes, often exhibit a peculiar expression altogether different
from their usual appearance. The expression which has most struck us
and which we have seen on several occasions, is a fixed and staring look,
lasting but for an instant, as though the child were looking intently at
some object, while in fact it is gazing at vacancy; at the same time the

the nature of the disease in the course of which they occur. 
quently the convulsions occur at the very outset of the dise
brain or spinal marrow, when of course there will be no prodro
toms whatever. According to Dr. Marshall Hall (*Diseases of th
System*, p. 149), the first and most frequent sign showing that 
motory system is becoming complicated in diseases of the brai
ing, after which come strabismus, a contracted state of the mus
thumbs or fingers, or some unequivocal spasmodic or convulsive
of the respiratory muscles, or of the muscles of the limbs.

*Symptoms of the Attack.*—With or without the precursory 
just described, the convulsion itself usually begins suddenly.
often utters a cry; loses consciousness and is seized with powe
contraction of the voluntary muscles; the eyes are for a mon
and staring, and then drawn obliquely upward under the upper l
the white portions of the balls alone are visible for an instant
the partially open lids; the trunk is rigid and stiff, the thorax in
the respiration suspended by rigid spasm of the respiratory mu
face, for a moment pale, usually becomes livid and congested
veins of the neck are distended.

This state of tonic spasm is followed quickly by the stage 
spasm, in which involuntary and most irregular convulsive m
occur. The eyes are rarely fixed in one position, but are const
tated in various directions, from side to side, or upwards and do
very often there is the most violent strabismus; the eyelids are s
open, at others shut; the pupils may be contracted or dilated.
cles of the face next enter into contraction, and occasion the mos
contortions of the features. The mouth is distorted into variou
the lips are often covered with a whitish or sanguinolent froth,
jaws tightly clinched together by tonic spasms, or agitated by c
movements, so as to produce grinding of the teeth. The trun
body is also sometimes variously contorted by clonic convulsio

apid, and generally rhythmical movements, the hand is quickly pronated nd supinated upon the arm, or finally the whole upper extremity is wisted and distorted into various positions, which it is impossible to describe. The inferior extremities undergo similar movements, but almost lways in a less degree than the upper. The respiration during the attack is irregular, sometimes suspended by rigid spasm of the respiratory muscles, and sometimes accelerated. A spasmodic contraction of the arynx, producing noisy inspirations, has been noticed by several writers. We shall find when we come to consider the nature of this disease, that Dr. Hall is of opinion that a more or less complete closure of the larynx s the most important feature of the convulsive crisis. The face is often ivid and deeply congested, especially when the respiration is embarrassed; the head is hot, whilst the extremities are cold; the pulse becomes large and full, or frequent and small, and sometimes cannot be counted in consequence of the contractions of the muscles of the forearm. The face is not always however congested. We have sometimes seen it perfectly white, while the convulsions were severe, and the child profoundly insensible. The action of the heart is tumultuous, and sometimes irregular or intermittent. When the attack is very violent, the urine and fæces are occasionally discharged involuntarily, but these are rare symptoms. Deglutition is seldom impossible even in the severest fit. In severe, and especially in long-continued attacks, intellectual consciousness, and general and special sensibility, are all abolished. In milder cases, though consciousness is destroyed, some of the special senses still respond to irritants, whilst in still slighter cases, the intelligence also is more or less preserved.

As the termination of the attack approaches, the convulsive movements become more and more feeble, until they finally cease entirely, and the child falls into a state of deep sleep, or of more or less profound stupor.

Convulsions are not always, as we have just described them, general. They may be circumscribed or partial, affecting one side of the body more than the other, or one side alone, or a single arm, or in some cases, indeed, only a single muscle, as the biceps. Sometimes they implicate the eyes only. The inferior extremities are rarely affected alone. Of the partial convulsions the most frequent are those in which some parts of the face and upper extremities are attacked. In this form of the disease, the disorders of the circulation and respiration, the congested tint of the face, the froth upon the lips, and the derangements of intelligence and sensibility, are much less strongly marked than in general attacks.

In still other cases, which have been by various authors grouped together under the objectionable title of "inward convulsions," the spasm affects chiefly the muscles of respiration; at times being limited to the muscles of the larynx, and constituting the affection we shall describe in a special article under the name of laryngismus stridulus; at others affecting principally the diaphragm and the thoracic and abdominal muscles of respiration.

The *duration* of an attack of eclampsia concerns both the length of the convulsive crisis and the continuance of the disposition to renewals of ness or delirium, or finally of coma. The period during which th position to recurrence continues, depends principally upon the ca the convulsions. If this continue in action, they will be apt to re until it is removed.

Idiopathic and sympathetic convulsions generally consist of a si attack, though there are sometimes several, which occur at interv some hours, or of one or two days. Sympathetic convulsions u occur either at the beginning or termination of the disease which t complicate, and much less frequently during its middle period. Of cases of this form observed by ourselves, complicating measles, sc fever, erysipelas, pneumonia, bronchitis, cholera infantum, simple ar and dysentery, in which the period was carefully ascertained, they curred at the invasion alone in 25, at the termination alone in 15, a middle period alone in 3, and at the invasion and termination both It is curious to remark, that of the 25 cases that occurred only at th vasion of the disease, all but 7 recovered; that the 3 occurring in middle period alone, also recovered; that of the 3 occurring both at invasion and termination, 2 died; and that all of those which occurre the termination alone, proved fatal.

MM. Rilliet and Barthez state that half the cases of symptomatic c vulsions observed by them, occurred at the commencement of the e phalic disease. This form seldom consists of a single crisis; the att on the contrary, are repeated from time to time. The authors just q state that whenever the convulsive attacks have recurred repeatedly w a period of a few days, they have proved symptomatic of disease of brain.

Nature of the Disease.—One of the most important contributi which has been made towards a plausible and satisfactory explanati the pathology of convulsions in children, was afforded us in the writi of Dr. Marshall Hall; and, although more advanced knowledge of physiology of the nervous system has shown that the part of the cer

The causes of these disorders may be of incident origin, acting upon excitor nerves; of centric origin, seated in the brain or spinal marrow; or of reflex origin, acting upon reflex or motor nerves. They are called, therefore, according to their causes, central or centric, when they depend on disease of the nervous centres; centripetal when they are excited through excitor nerves; and centrifugal when they depend on disease of the motor nerves.

Dr. Hall as is well known ascribed great importance to the condition of the glottis in convulsions. He says (p. 323), in speaking of epilepsy, "The second symptom is a forcible closure of the *larynx* and *expiratory efforts*, which suffuse the countenance and probably congest the brain with venous blood." At page 327, he says: "A spasmodic affection of the larynx has obviously much to do in this disease (epilepsy), as well as in the crowing inspiration or croup-like convulsion of infants; so much, indeed, that I doubt whether *convulsion* would occur without closure of this organ." In describing the croup-like convulsion or laryngismus stridulus (p. 180), he says: "I must repeat the observation that the respiration is actually arrested by the closure of the larynx; and there are forcible expiratory efforts only or principally in the actual convulsion." In a later publication, Dr. Hall says: "Without closure of the larynx, extreme laryngismus, and the consequent congestion of the nervous centres, there could I believe be no convulsion! This closure of the larynx must be complete in the affection under consideration (laryngismus stridulus), as in all others, before convulsions *can* take place." (*Braith. Ret.* from *Lancet*, June 12, 1847, p. 609.)

It is, however, evident that the obstruction to respiration exists not only in the larynx, but in the thorax, the muscles of which are rigidly contracted. Nor can we at present admit that this spasm of the muscles of respiration is more than coincident with the other phenomena of the convulsive attack; and indeed there are reasons for believing that the accumulation of venous blood in the nervous centres which follows the obstruction of respiration, so far from causing the convulsion, has a tendency to arrest it, and to induce a state of coma.

It is, however, easy to comprehend the mode of production of sympathetic convulsions by reference to these doctrines. They evidently depend upon morbid impressions conveyed to the cerebro-spinal axis through the excitor nerves having their origin in the diseased organs, probably conjoined with a state of undue reflex excitability of certain parts of the nervous centres. Thus it is easy to understand why inflammation of the parenchyma of the lung in pneumonia, of the bronchial mucous membrane in bronchitis, of the mucous membrane of the bowel in entero-colitis or dysentery, or the pharynx in angina; why the pressure of a tooth upon an inflamed gum during dentition, the presence of a foreign body, as newspaper (in one of our own cases), or crude food, in the stomach, or fecal, or lienteric accumulations in the intestine, should produce a degree of irritation in excitor nerves, sufficient, when transmitted to the sensori-motor ganglia, to occasion the convulsions we have been considering.

the existence of fever, no matter what be the cause of the fever.

The explanation of the production of idiopathic or essential sions is not always so easy, because we are sometimes unable to any cause, either centric, centripetal, or centrifugal, to account excitation of the nervous system. It seems probable, however, th must depend, like those of the sympathetic form, upon some unhe and therefore irritating condition, acting upon the excito-motory of nerves. The cause may be so slight as to escape the notice physician, and yet sufficient to produce a convulsive crisis in a chil disposed to eclampsia. It may be an unnoticed dentition, some gested food in contact with the stomach or intestines, or accumu of unhealthy fecal substances, or of vitiated secretions, in the inte When convulsions have followed a vivid mental emotion, as pas vexation, they are evidently a result of the influence of that co upon the nervous centres. Acute pain, which is said to have occ essential eclampsia, as well as exposure to violent heat or severe must produce their effects through their action upon incident e nerves. There is also in all probability, in most children who suff convulsion, a state of preternatural mobility and increased reflex e bility of certain parts of the cerebro-spinal axis, which predisp disorderly nervous action, even upon trifling causes. There can b doubt that this irritability of the nervous system is frequently inher though it may be acquired in the course of chronic debilitating dis Although we have described these convulsions under the title of ess and sympathetic, we do not mean to assert that they are absolutely pendent of any material changes in the nervous centres, but merely up to the present time, no appreciable lesions have been detected as causes. It is indeed true, that, in a certain number of instances, death from eclampsia, there are found engorgement of the vessels membranes and of the substance of the brain, serous effusion int cavity of the arachnoid or the lateral ventricles, or even actual ce

Diagnosis.—There are two important points to be considered in treating of the diagnosis of eclampsia: the diseases with which it may be confounded, and the causes which may have produced the convulsions, or, in other words, their distinction into essential, sympathetic, and symptomatic.

The only disease with which eclampsia is likely to be confounded, is epilepsy; the mistake could only be made when the former is violent, and when it is accompanied and followed by unconsciousness. In epilepsy, however, the invasion is more sudden, the convulsions are accompanied with greater rigidity, there is always frothing at the mouth, the duration of the crisis is shorter, and it is generally followed by more marked stupor. If the convulsive attack have occurred under the influence of an appreciable cause, if the parents are not epileptic, and if the child is very impressionable, it is probably eclampsia. Again, the younger the patient, the more likely is the case to be one of eclampsia; whilst if the child is approaching towards puberty, if the attacks are frequently repeated, and yet not dependent on fever, and if they are followed by complete restorations to health in the interval, the disease is much more likely to be epilepsy.

The diagnosis of the form of the attack, whether idiopathic, sympathetic, or symptomatic, is exceedingly important, as upon this must depend in great measure the prognosis and treatment. It is often very difficult, and sometimes impossible, to determine at the moment to which class the convulsions belong. The most difficult points in the diagnosis are the following: first, when a child previously in good health, is suddenly seized with the disease, to determine whether it is essential; whether it is sympathetic and occasioned by disease which, up to this instant, has been latent, or by the invasion of some one of the acute local diseases, or of one of the continued fevers; or lastly, whether it is symptomatic, marking the invasion of a disease of the cerebro-spinal axis: second, when the convulsion occurs in the course of a disease not implicating the nervous centres, to determine whether it is merely sympathetic of that disease, or whether it is symptomatic of an intercurrent affection of the brain or spinal marrow.

It is impossible, for want of space, to treat of all these points in detail. The enumeration of them, however, will be useful in calling the attention of the reader to their importance.

An essential convulsion is only to be distinguished by careful study of the antecedent history and present condition of the patient. If, after a thorough examination of all the organs, no diseased point can be detected, and if the child recover perfectly from the convulsion, we must conclude that the case has been an idiopathic one, in which the cause is beyond our reach. We are disposed to believe, however, as has already been stated, that in most such cases there has been a source of irritation in some of the organs of the body, which has acted as the excitant to the excito-motory system, and which, if we could but detect it, would warrant us in classing the case amongst sympathetic convulsions; and on this account a searching physical examination should be made in every case, as a matter of course.

return to consciousness and health is speedy. The probable depe
of the attack upon indigestion is to be ascertained by the absence
causes, and by our learning upon inquiry that the child had eaten
indigestible substance within a few hours or a day or two before the
Its dependence on intestinal accumulations is to be arrived at by th
negative or exclusive method, and by learning that the patient is
or has been of late, of a constipated habit.

When the attack occurs in the course of some other disease, as
monia, catarrh, enteritis, pertussis, scarlatina, or measles, it is
certainly sympathetic. It may possibly, however, be indicative of
tercurrent attack of cerebral disease. This can be determined
attention to the consecutive phenomena. If the attack be short, an
followed by complete restoration to consciousness, it is in all prob
sympathetic. If, on the contrary, the convulsive crisis be long
vere, if the recovery from it be slow and imperfect, if it be follow
violent agitation, somnolence, or coma, or by some persistent le
motility, there is every reason to fear an attack of disease of the b

Sympathetic convulsions, occurring at the invasion of different
general diseases, are to be distinguished only by observation of the
toms that follow the crisis, which will be those belonging to the par
malady whose approach has caused the attack of eclampsia.

Symptomatic eclampsia is characterized by various signs of ence
disorder, which soon follow the convulsive attack. The most imp
of these are severe and continued headache; diminution or exalta
general or special sensibility; dilatation or contraction of the
irregular movements of the eyes; flexion or stiffness of some of the
or of the fingers or thumbs; disordered intelligence; or the sym
which have already been described in the articles upon the disea
the brain.

**Prognosis.**—The prognosis of essential convulsions must depe
the nature of the cause and the violence of the attack. When the

of the disease which it complicates, and on the stage of that disease at which it occurs. Thus, in scarlatina, convulsions, especially when they occur in the first few days of the disease, are almost always fatal, in measles much less so, and in other diseases in various proportions. They are very apt to terminate unfavorably when they occur after the malady which they complicate has been in progress for several days. This is a remark made by various authors, and we have already stated that of 46 cases of this form in which we carefully ascertained the period of their occurrence, 25 appeared at the invasion, of which all but 7 ended favorably; 3 at the middle period, which all recovered; 3 both at the invasion and at a later period, 2 of which were fatal; and 15 after the cases had been progressing for a considerable time, all of which proved fatal. In addition to these important elements for making the prognosis, we must consider, also, the duration and degree of violence of the paroxysm, the state of the patient after the fit as to its cerebro-spinal functions, and lastly the age and constitution of the child.

The prognosis of symptomatic convulsions must depend very much upon that of the disease of which they are the symptom. It may be stated, as a general rule, that, like those of the sympathetic class, they are less dangerous when they occur at the beginning than at a later period of the disease. They are always, however, very dangerous. Of 22 cases that we have seen, 19 were fatal.

It frequently happens, however, that although life is not destroyed by the convulsions, certain grave sequelæ remain, among which the most frequent are paralysis, disorders of the mind, and defects of speech or vision. These symptoms are, it is true, far most frequent in cases of symptomatic convulsions, where they depend upon the same lesion of the brain which occasioned the fit. They may, however, succeed convulsions which we are still obliged to call essential, although there very possibly is some minute alteration or defect in a part of the nervous centres, which our means of observation do not suffice to detect. In such cases these sequelæ probably depend upon some lesion of the brain, such as cerebral hemorrhage, which has occurred as a result of the convulsion.

Hemiplegia, which is the form of paralysis which most frequently follows eclampsia, is most apt to occur when the fit has been limited to one side of the body; it is often temporary, and passes away in a few days, though it may remain persistently. Dr. J. Hughlings Jackson suggests that, in the absence of evident disease in such cases of unilateral convulsion and palsy in children, the symptoms may depend upon the plugging of very small vessels in the brain.

TREATMENT.—We shall confine our remarks upon the treatment of eclampsia to the essential and sympathetic forms of the disease, having already treated of that of the symptomatic form in the articles upon the cerebral diseases which give rise to it.

We think that the treatment of eclampsia in children may be simplified if we pay attention to two distinct conditions of disorder, which appear to exist in every case. These are the condition of morbid irritation or derangement of the excito-motory system of nerves, and the cause which careful, therefore, in the course of our remarks, to treat of the r most proper for the removal of the cause, whatever it may be, w as the irritant to the nervous centres; and of those calculated to or allay the deranged condition of those centres and the effect derangement.

There are some general rules to be followed in the treatment vulsions which apply to all cases, and of these we shall first speak are, to place the child in a large *well-ventilated* room, if such ca cured; if it have been seized in a little close room, where the atm is dense and impure, removal to another room, or exposure to before an open window, has sometimes sufficed to terminate th At the same time the clothes of the child should be loosened, in prevent all constriction, and if necessary taken off, to allow of examination of the whole body. We believe it is a good rule al place the child, no matter what be the cause of the convulsion, i severe one, in a *warm-bath* (96° or 97° F.). This has frequently an efficient remedy, according to our experience. It is easily in most cases, and we are quite confident that we have never k do harm, though we have used it in almost every case. The patien be kept in the bath some ten, fifteen, or twenty minutes, or until vulsive movements cease; when taken out it is most convenient the same time useful, to envelop it in a small, light blanket, or for a short time, before the clothes are readjusted.

In cases where the attack of eclampsia is limited to a single co seizure, we rarely have an opportunity of instituting any treat the paroxysm itself, since it is usually over before we reach the In such instances, bloodletting is unnecessary. If, however, th tunity offers, and if the convulsion occur in a strong and vigorous if it be violent, and accompanied by a deep red, or yet more b flush of the face, and distension of the veins of the head and neck; more than a few minutes, or is repeated after short intervals of slight severity or short duration of the attack; or those which occur in the course of other diseases, and particularly at their termination, and in which a resort to it is rendered evidently improper by the circumstances of the concomitant affection. The quantity of blood to be taken, and the method, must depend on the circumstances of the case. We must be guided as to the quantity by the age and constitution of the patient, the violence and duration of the paroxysm, and the cause of the attack. In a strong, hearty child, two or three years of age, in whom the attack is violent, and produced by some cause not likely to continue long in action and thereby exhaust the strength, we may take from two to four ounces at the first bleeding; and should this fail to exert an influence upon the paroxysm, a rather smaller quantity may be taken in one or two hours afterwards. In younger children, and those who are somewhat feeble or delicate, the amount drawn ought to be less. Usually speaking, venesection is to be preferred; but when a general bleeding cannot, from any cause, be employed, we may resort to cups and leeches to the temples or back of the neck, or, as advised by some of the French writers, to more distant parts.

We believe it is useful in all cases of essential and sympathetic convulsions, which resist the employment of a warm-bath and bleeding, and also when bleeding is not resorted to, to make use of an *emetic* of some kind. The act of vomiting alone is often sufficient to break up a paroxysm of convulsions which has resisted various other means. This we learned first from the advice of an old and experienced practitioner, who was in the habit of employing emetics in all cases of eclampsia of children, and we have since seen it tested on numerous occasions. Dr. Hall recommends the induction of vomiting in the treatment of the paroxysm of the croup-like convulsion or laryngismus stridulus, and as a means of prevention in epilepsy. In the former he employs irritation of the fauces by tickling with a feather; in the latter, ipecacuanha. He says that a new mode of action is induced in the true spinal system by the act of vomiting, so that the disposition to closure of the larynx, and expiratory efforts, is exchanged for sudden acts of inspiration. The emetic which we employ is ipecacuanha. The employment of emetics is generally advisable, even when there is no evidence that the attack is due to the presence of undigested or irritating substances in the stomach, since in cases of sudden eclampsia the cause is so frequently some gastric irritation. Of course, when there is special reason to suspect the presence of such a condition, the indication for the administration of an emetic is even more positive.

In addition to warm baths, bleeding, and emetics, *cold applications* to the head will be found proper and useful in nearly all cases which are of any considerable violence. Their use would be improper, however, when the surface is pale, the features contracted, and the pulse small and feeble; but whenever the skin, especially that of the head, is deeply colored and turgid, and the pulse full and strong, they ought to be employed from the beginning. While the child is in the bath, its head may be wrapped in a cloth wet with ice-water; or, after it has been removed, cold water may be poured from pitchers or a tea-kettle upon the same part. If the latter is done, enough should be employed to prevent the sudden reaction which violent determination of blood towards that organ. The in severe cases occurring in hearty children is *calomel.* I ous because of its easy administration, its speedy oper powerful sedative influence which it exerts upon the whole dose should be from three to six grains, according to the to be followed in one or two hours by some other cathartic either castor-oil, rhubarb, jalap, or salts. The best of all it can be given. When the attack is slight or the patient cate, castor-oil is particularly applicable, as it operates wi tation to the intestine, or we may employ a mixture of spiced syrup of rhubarb. Whatever the remedy may be given only in such quantity as to produce complete eva bowels and a moderate derivation upon those organs, with occasioning a degree of irritation sufficient to increase the the nervous system already existing.

In many, indeed, in most cases of eclampsia it will be f gative *enemata* are of great service. They may be admin diately before or after the bath, and not unfrequently hav stopping the paroxysm. They may consist of water holding or solution castile soap, common salt, molasses, castor-oi spirits of turpentine. If the first fails to operate in ten or fi another or even a third ought to be given.

*Revulsives* are of the utmost importance in the treatm sions. They should be employed from the very first, or imr the use of the bath. In slight attacks, they alone are ofte suspend the paroxysm, or at least the fit often ceases ur Mustard is the most useful and convenient form of appl great majority of cases. It may be used either in the form which are to be shifted from place to place, or in that of When sinapisms are used, they should always be covered fine muslin, to avoid the danger of leaving any of the mus llent effect the oxide of zinc in combination with extract of hyos-amus. We have had but little experience in regard to their use, but onfess ourselves indisposed to resort to them except after the employ-ent of the means already detailed; during the intervals between the s, when these occur from time to time; and as a means of prevention children threatened with the disease. There can be no doubt, from e evidence adduced in regard to their effects, and from what we have rselves seen of the influence exerted by valerian upon the convulsive henomena of acute cerebral diseases, that they have a considerable ower of allaying the disorder of the locomotive apparatus present in all onvulsive affections. As a means of prevention, therefore, as adjuvants other remedies, and in children of very nervous, irritable temperament, nd delicate constitution, in whom it is improper to use the more power-l agents already detailed, we would advise a recourse to substances of is kind. The ones mostly highly recommended are valerian, oxide of inc, assafœtida, and camphor. Of these, valerian or assafœtida are the nes we have usually employed. Valerian is best given in the form of he fluid extract, of which from ten to twenty drops may be administered water, to a child two years old, every half hour or hour, until several oses have been exhibited, after which it ought to be suspended for a hile or given in smaller quantity. Assafœtida is best given in the form f emulsion, half a teaspoonful being administered by the mouth, or one r two teaspoonfuls mixed with a little warm water may be thrown from me to time into the rectum. M. Brachet gave the oxide of zinc in com-ination with extract of hyoscyamus, to the amount of at least two grains f the former and four of the latter in twenty-four hours, divided into four, ight, or twelve doses. A dose was given every two or three hours, and hen the symptoms were very violent, the first two or three were repeated t much shorter intervals. He says, speaking of this remedy (*Traité Prat. des Convulsions dans l'Enfance*, deux. édit., p. 402-3), "I always ound it to produce quiet; but whilst the cause remained, the quiet was nly momentary, and the remedy seemed to have produced no effect. . . . his remedy does not destroy the cause (of the convulsion), but it allows ime to treat it by calming the nervous erethism."

*Opium* is a remedy which requires much care and discrimination in ts employment, but which, in certain conditions of the disease, is of the greatest service. It should not generally be given while there remain ny evidences of considerable determination of blood to the brain, but when this condition does not exist, or after it has been removed by blood-etting and revulsives, opium proves very useful in allaying irritability nd restlessness, which themselves seem to keep up a disposition to a eturn or continuance of the convulsive phenomena. Somnolence also, nd still more, coma, likewise contraindicate the use of opium. Dr. Eberle thinks he has seen much advantage from frictions over the spinal egion with a mixture of equal parts of oil of amber, laudanum, and spirits f camphor, particularly in very young infants.

*Chloroform* has been highly recommended in the essential convulsions f children, by Sir J. Y. Simpson (*Edin. Med. Jour.*, June, 1858), and is in the treatment of almost all forms of convulsion, may advantage, especially when the convulsions continue to re less regular intervals. It may be given in doses of one three or four times daily, from the age of six months to an additional grain for every year.

We shall here conclude our remarks upon the general eclampsia, and proceed to make some observations on the pursued under particular circumstances.

It is always highly important for the direction of the tre cover the cause of the attack. This is sometimes very easy, instances it is exceedingly difficult, and not unfrequently i the attack occur in the course of some acute disease, catarrh, angina, enteritis, or dysentery, or during the prog the eruptive diseases, the diagnosis of the case is, as a gen easy. If, on the contrary, it occurs at the commencement affections, the diagnosis will be much more difficult, unle symptoms of the concomitant disease have already declared should do so very soon after the convulsion. The treatmen should be that laid down in our general remarks, modified the requirements of the particular disease during the cours eclampsia occurs.

When the attack occurs suddenly in a child previously i or who had been merely slightly ailing for a few hours, th the cause is still more difficult. The most probable caus circumstances are, however, dentition, indigestion, intestin the approach of an acute general or local disease. It is eas by inquiry of the attendants, and by examination of the m the child is teething or not. As a general rule, the conv depend solely on the process of dentition, are slight, and la time. In all the instances that we have seen, in which such cause to be detected, the attack was of this nature.

ed only by ascertaining with great care the diet of the child during the evious days. If it appear that something of an indigestible nature has en eaten within a short time, and if, at the same time, it be impossible detect any more evident or probable cause for the attack, we should ve a right to conclude that it depends upon indigestion. Under these rcumstances the proper treatment is the immediate use of the warm th, and the earliest possible administration of an emetic of ipecacuanha. e operation of the emetic may often be hastened by tickling the fauces th a quill. If the paroxysm be very severe and long-continued, bleed- g ought to be resorted to.

The presence of intestinal accumulations as the cause of the paroxysms ay be inferred, when it is found upon inquiry that the patient has been nstipated for some days, or that the stools have been scanty and hard, scanty and very offensive; when the abdomen is distended and hard, d the distension is ascertained by palpation and percussion, not to be erely tympany; and lastly, when there is no more evident cause for the tack. In such a case the particular treatment is the use of purgatives d enemata, in addition to the other means detailed.

If the child presents the symptoms of dyspepsia and malnutrition, as- ciated with anæmia, and the convulsions recur during a long period, e most scrupulous care must be taken to secure a nutritious, digestible et, combined with the use of tonics and iron.

The dependency of the attack on the approach or commencement of me acute general or local disease, can be inferred only from a very reful examination of the antecedent and present phenomena of the case. ne of these may be suspected as the cause when we can account for e occurrence of the convulsion on no more reasonable supposition; en neither dentition, indigestion, nor intestinal irritation exist. It is arcely likely that a convulsion could be occasioned by any of the acute oracic or abdominal affections, unless the disease had already gone far ough to allow a careful examination of the different rational and physi- l symptoms, to determine its existence. Perhaps the most difficult ses to diagnosticate, are those which occur at the beginning of the uptive fevers. Even here, however, a careful search for the prodromic mptoms of the disease, a watchful observance of the condition of the tient in and after the paroxysm, will generally lead to a correct opinion ithin a few hours, or after a day, and sometimes at the moment of the tack. Of the eruptive diseases, scarlet fever is much the most apt to accompanied by convulsions at the onset, and in that disease the re- arkable rapidity and activity of the pulse, the state of the fauces, the at of skin, and early appearance of the eruption, will generally enable to understand the cause of the convulsion at a very early period.

The treatment of sympathetic eclampsia depending on acute thoracic abdominal disease, should be that which is proper for the particular alady which they complicate, with the addition of warm baths, revul- ves, antispasmodics, and, after depletion, of opium, in the form of over's powder combined with nitre. The management of the convul- ons which complicate the eruptive fevers, will be specially treated of in articles on those maladies.

attacks occur suddenly, and at irregular intervals, are of
cease suddenly, and are unaccompanied by cough, or oth
tation of the larynx. If the disease progress, it becomes
other convulsive symptoms, as strabismus, distortion of
pedal spasms, or general convulsions.

It is "the peculiar species of convulsion" of Dr. John
ward fits of Underwood; the spasm of the glottis of M
Vogel; the laryngismus stridulus of Good; the croup-lik
Dr. Marshall Hall; child-crowing; the spasme de la glott
French writers; one form of the internal convulsion of
and Pidoux, of MM. Rilliet and Barthez, and of J. L.
thymic asthma of some of the German authors. It is n
Dewees. It is described by Eberle under the title of car

The frequency of the disease seems to vary in differen
France it would appear to be somewhat rare. MM. Ril
(2ème édit.) speak of having seen nine cases. At the tim
of their first edition, they had met with only one case,
that they were acquainted with only one other, published
in the *Bulletin de Thérapeutique*. M. Blache (article *Né*
*Dict. de Méd.*, t. xvii, p. 590) adverts very cursorily to on
leix (*Guide du Méd. Prat.*, Art. Asthme Thymique) dou
as a distinct disease. In Germany, on the contrary, it
a rather frequent disease. In England it cannot be very
Merriman says it is by no means uncommon. Copl
*Laryngic Suffocation in Children*, *Dict. of Prac. Med.*),
ous cases that he has seen, and states that he has had
under treatment at the same time. Ley speaks of havi
siderably above twenty cases. Dr. Marshall Hall rema
the short space of one month, I have seen five cases of
sion." Dr. Charles West (4th edit., p. 162) mentions thir
which he has preserved some record.

n, 9 were six months or less of age, 6 between six months and a year, tween one and two years of age, 1 of two, and 1 of four years of ; so that of the 20, fifteen were under one year. It is evident, there- , so far as these cases go, that the majority occur within the first, and few after the second year.

the 37 cases mentioned by Dr. West, 31 occurred in children between months and two years of age. All the cases seen by MM. Rilliet and hez were in children under two years old. Those authors state that even subjects observed by M. Hérard were more than two years of and that two of them were between three and four years old. From statements made by authors in general, it would seem to be most fre- t between the ages of three weeks and eighteen months. It has been n, however, in one very rare instance, to occur as late as seven years ge.

*x.*—It is most frequent in the male sex. Of 50 cases (45 from ors, and 5 by ourselves), 39 occurred in boys, and 11 in girls. MM. et and Barthez state that of 16 cases observed by themselves and by érard, 12 occurred in boys, and 4 in girls; of 183 cases collected by M. ent, in which the sex was noted, 125 occurred in boys, and 58 in girls.

*onstitution.*—Authors who have written on the disease generally ex- s the opinion that it is most frequent in children of nervous tem- ament, in those who are delicate and feeble, and especially in those scrofulous or rickety constitutions. It is nevertheless acknowledged t it sometimes occurs also in the most healthy and vigorous subjects. ot unfrequently attacks several children in a family. Ley quotes four ances from other writers, in which three children in each family had disease, and in one all three died. He states that his own experience y confirms this fact.

M. Rilliet and Barthez (2ème édit., note, t. ii, p. 527) state that Davies Henrich have met with four, and Torgord five children of the same ily affected with the disease. They quote from Reid the curious fact t Powell saw one family of thirteen children, not one of which escaped disease.

mongst the causes of the disease, in addition to those already men- ned, must not be forgotten *dentition* and *improper food*. These two , indeed, probably the most influential of all in the production of the mplaint. The age at which it occurs most frequently, the last half of first, and the first half of the second year, the very period during ch the process of dentition is most active, would alone go far to show t this must constitute one of its most powerful predisposing, if not iting, causes. The opinions of writers on this point are also conclu- s as to the great influence of this vital process. Improper food, and ecially early weaning, and the attempt to bring the child up on hand, clearly a potent predisposing cause of the disease. This has been rly shown in the cases that have come under our own observation, l especially in one in which contraction with rigidity followed the symp- ms of laryngismus. The details of this case will be found appended to article on contracture. Dr. James Reid, in an excellent work on the disease (see *Brit. and For. Med. Chirurg. Rev.*, July, 1849, p the following conclusions as to its etiology: "1. That for the of this complaint, the cerebro-spinal system is required to b liarly excitable state, which then acts as a predisposing cause. of teething is the most likely to produce this condition. 2. T this irritable state of the nervous centres, the two most freq the majority of instances the combined) causes are the impro tion of food which is administered to the infant, and the imp tating atmosphere which it breathes."

NATURE AND EXCITING CAUSES; FORMS.—Much difference has prevailed in regard to the nature and exciting causes of stridulus since the disease has attracted the particular notice fession. Kopp and other German authors ascribe it to com the respiratory organs by an enlarged thymus gland, while ot nation, and some of the English and French writers, class it am neuroses. Dr. Hugh Ley supposed it to depend on compressi par vagum nerves by enlarged cervical and bronchial glands. shall Hall considers it to be a disease of the reflex system Amongst the French writers, MM. Rilliet and Barthez regard it rosis; Valleix and Trousseau treat of it as one form of conv children; Blache (*Dict. de Méd.*, t. xvii. p. 584), speaks of it as a of the larynx, which may be either symptomatic or idiopathic.

Before examining in detail the different opinions quoted ab we propose doing, we will refer to the anatomical appearance malady.

The mucous membrane of the air-passages, as a general rule perfectly healthy, presenting neither redness, inflammatory œdema, nor accidental products of any kind. The lungs are the natural color and density, and crepitant. M. Hérard (*B Prat.*, t. v, pp. 319, 320) observed that in several autopsies ma self, they always presented one marked change from their us dition, however, which was a very high degree of emphysema. ral and strongly marked than in any other disease. This alt believed to depend, as it does in hooping-cough, upon the imped respiration which exists during the disease. MM. Rilliet an state, however, that emphysema was not present in any of their

The heart and great vessels of the thorax often, but not al tained more blood than usual, as in asphyxia.

M. Hérard states that he has made very minute researches in the condition of the nervous system, examining the brain and sp row, the pneumogastric, recurrent, and diaphragmatic nerves, of the extremities even, to their terminations, without, however important lesions in any case. He excepts only serous effusio quantity, and evidently consecutive, in the ventricles and partic the membranes of the brain, and slight venous congestion of kind. The tissues of the brain and spinal marrow retained th nary consistence, and presented neither redness nor softening.

The condition of the pneumogastric nerves has, however, been va orted by different authors, some having found them softened, others lurated.

In some cases tuberculosis of the lungs or bronchial glands, has been served. But as these, as well as all the other lesions mentioned, are t constant, they cannot be regarded as characteristic. In many in- ances more or less marked evidences of rickets are discovered upon e bones of the cranium, the ribs, or the long bones of the extremities.

We will now examine as succinctly as possible the different opinions ich have been advocated in regard to the causes of laryngismus strid- us. These may be classed, it seems to us, under four heads. 1. Enlarge- ent of the thymus gland. 2. Enlargement of the cervical and bronchial ands. 3. Organic disease of the cerebro-spinal axis. 4. That which re- ards it as a simple neurosis, without appreciable anatomical alterations.

1. *Enlargement of the Thymus Gland.*—That the disease is in some ases coincident with, if not dependent upon, this condition, is proved by e observations of Kopp, Hirsch, Haugsted, Kyll, and others. Hasse *Pathol. Anat.*, Syden. Soc. Ed., p. 384) says there can be little doubt that sometimes depends upon this cause.

It appears to us, however, that it has been clearly shown by M. Hérard *oc. cit.*, p. 320, 321), that the disease is entirely independent of any altera- on of the thymus. That observer found that in six children between two nd four years old, dying of the affection, the gland weighed between half drachm and a drachm in five, and four drachms and two scruples in the xth. These cases alone show that the size of the gland varies greatly different subjects attacked with the disease. M. Hérard has examined e gland, with a view to the elucidation of this point, in sixty children ying with various diseases, between two and four years of age (the age f those who had died of the disease under consideration). In fifty he ound that it presented the same arrangement, color, density, and weight, s in those who had perished with laryngismus stridulus. All of these ubjects exhibited the same aspect; they were pale, thin, and most of hem exhausted by diarrhœa. In ten of the sixty the gland was much ore voluminous, weighing from two to two and a half or five drachms, nd in one instance an ounce and a quarter. The ten subjects upon which hese observations were made, died of different diseases, croup, acute aryngitis, asthma, meningitis, and varioloid. All exhibited the appear- nces of strong and vigorous health; the one which presented the largest land was very fat, and so robust, that, though only twenty-two months ld, he looked to be three or four years. It appears to result therefore from hese researches, that the gland is liable to great variations of size, and that ts size bears a very exact proportion to the force of the child, being small n those who are slightly developed, or emaciated by chronic disease, and oluminous in those who are vigorously constituted, or who have died of cute diseases.

That the disease does not depend, at least in all cases, on this cause, is hown also by Haugstead (*Arch. de Méd.*, t. xxxiii, 1833, p. 111), who re- orts the case of a girl, seven years old, in whom the gland weighed five unces, and measured four inches long, and one and a half in thickness,

than one case of tubercular affection in children, where t
tric nerve has been completely flattened by the pressur
without giving rise to any remarkable disturbance of the
piration." Dr. Hall doubts the correctness of this expl
phenomena of the disease, and says that if the contigu
glands with the pneumogastric nerve have any effect, it is
upon it as an incident excitor, and not as a motor or mus

3. *Organic Disease of the Cerebro-spinal Axis.*—That it
this cause is proved by a case mentioned by Dr. Coley (*C*
*Children, Bell's edition*, p. 226), who states that in a fatal
occurred in his own family, the only morbid appearance fo
tion was a large exostosis growing on the inner surface
which compressed the cerebellum and produced chronic i
the dura mater. No disease was discoverable either in
thoracic glands. Dr. Kyll (*Arch. Gén. de Méd.*, t. xiv, 183
a case from Dr. Corrigan, of Dublin, which had lasted th
spite of calomel, emetics, and antispasmodics. Attention
chance to the spinal column, when it was discovered that
the third and fourth cervical vertebræ was very painful,
loud cries from the child. Two applications of four lee
terval of two days, to that point, removed all the symp
child recovered perfectly.

Dr. M. Hall (*Diseases and Derangements of the Nervous*
p. 99) states that the crowing inspiration may arise from af
centre of the excito-motory system. He quotes a case rela
Mr. Evans of Hampstead, of spina bifida, in which "there
like convulsion whenever the little patient turned so as to
tumor." He states, moreover, that he found induration o
oblongata in one case of the disease.

Dr. West has also noticed occasional attacks of laryngism
chronic hydrocephalus, occurring even before much enlarg
head had appeared.

y twenty-one months old, who was taken to the Children's Hospital at aris, with well-marked symptoms of laryngismus stridulus, and who died ere some days afterwards of small-pox. At the autopsy the larynx and rain were found to be healthy. Merriman also relates two cases in which e children died in fits, both of which were examined by a skilful anatoist, but "not the slightest appearance of cerebral affection" could be iscovered.

That it is not always, however, a neurosis, is also shown by the cases uoted under the first head from Drs. Hall and Coley, and by those in hich the disease is accompanied from the first by symptoms of inflamation or congestion of the brain.

It has now been shown that the causes of the disease are exceedingly ariable and uncertain, and that any opinion which asserts its dependnce on one invariable and constant cause is untenable. We must, thereore, seek some explanation which shall reconcile, as far as possible, the acts related above, and harmonize the various opinions expressed by the uthors quoted.

It seems to us that the explanation given by Dr. Hall (*loc. cit.*), is the nly one which accounts satisfactorily for the phenomena of the disease, and reconciles the contradictory accounts of its nature and causes rought forward. Dr. Hall regards it as an affection of the excito-motory r true spinal system of nerves, producing in mild cases partial closure f the glottis, and difficult inspirations, while in more severe cases the pasmodic disposition extends to other parts of the body,—to the eyealls, and to the flexors of the fingers and toes. We have already alluded o his theory that in very violent attacks of laryngismus, where the lottis is entirely shut, the suspension of respiration produces congesion of the nervous centres and general convulsions. As already stated, owever, this theory has not been accepted, and we regard the occasional ccurrence of general convulsions in connection with laryngismus stridulus, as one proof that this latter affection is merely a partial and imperfectly developed convulsion.

The causes may be either centric, seated in the nervous centres, or centripetal, in the excitor or incident nerves. In the great majority of cases, he causes are centripetal, consisting of various morbid conditions situated at the peripheral extremities of the nerves, which become causes n consequence of the irritation they establish in the nerve-extremities: his irritation is transmitted to the nervous centres, and thence reflected hrough the various efferent or motor nerves to the different portions of he muscular apparatus affected in the disease, the larynx, face, extremiies, and lastly, in severe cases, the whole body. The principal causes of his class are dental irritation occurring during dentition; gastric irritaion, arising from excessive or improper food; intestinal irritation from onstipation, intestinal disorder or catharsis; and perhaps the pressure of n enlarged thymus or of enlarged cervical or bronchial glands.

The centric class of causes includes such as are seated in the nervous entres. These are much less common than the former class, and give rise o a vastly more dangerous and intractable form of the disease. They are ifferent morbid conditions of the brain and spinal marrow, as inflamma-

This theory of the nature of the disease likewise accounts ing character of the convulsive symptoms. The laryngeal which the disease derives its name, does not constitute the w it is only one of the symptoms, though the principal one, which it is particularly characterized. The other convulsive which generally occur only in severe attacks, or after the continued for some time, are distortion of the face, strabi pedal spasms, and general convulsions. The hydrocephali which occur towards the termination of some cases, and th sion within the cranium found after death, are, it ought to b often the consequences of the congestion of the brain a which take place during the more or less complete closure o

SYMPTOMS; COURSE; DURATION.—Laryngismus stridulus denly with a paroxysm of difficult respiration. The larynx i spasmodically, and the entrance of air into the lungs is eith or impeded. In most cases the closure of the larynx is only the respiratory movement continues, but is accompanied by pr difficult inspirations, which give rise to the crowing or strid whence the disease derives its name. The crowing sound heard several times in each paroxysm, owing to the repea partially successful attempts at inspiration; while in very vio occurs only at the beginning and end of the accession, the being entirely suspended in the middle period. At the sa child presents an appearance of great distress. The body is cibly backwards, the eyes are fixed and staring, the nostrils the whole countenance indicative of great anxiety. If th continues many seconds, the face becomes bluish, the extr and the fingers and toes contracted. After a few seconds, or even longer, the spasm of the larynx ceases; a loud, full takes place; a fit of crying generally follows, and the child tion of cold, and other sudden impressions. At the commencement of e disease they recur at rare intervals, and often attract little notice; t, as the case progresses, they become more frequent, and may amount twenty or thirty in the day, according to Kerr. They sometimes cease tirely for some weeks, or even months, and then recommence. In a case tended by one of ourselves (reported in the *Am. Jour. Med. Sci.*, April, 47, p. 287), the attacks lasted eighteen days, occurring sometimes two three times in an hour, and sometimes much less frequently. The ild then recovered entirely for a period of seven months, when the dis- se returned, and after continuing for five days, caused the death of the ild in one of the paroxysms.

If the disease continues to progress, it almost always becomes asso- ated with other spasmodic symptoms. The thumbs are drawn tightly to the palms of the hands, and the fingers clasped over them, which ves to the back of the hands a swelled and tumid look. At the same me the toes are strongly flexed under the feet, and the insteps look velled like the backs of the hands. Sometimes the hands are bent on e forearms, and the forearms on the arms. There is often distortion of e face. In severe cases, or when the disease has continued for a con- derable period, epileptiform convulsions make their appearance, and enerally prove fatal.

The disease is apyretic in a large majority of cases. When fever arises almost always depends on the condition which has occasioned the dis- rdered action of the excito-motory system, or on some accidental com- lication. The pulse during the paroxysm is small, corded, rapid, and metimes imperceptible. In the intervals it is natural or nearly so.

Death may occur very early in the disease, or after some weeks, months, r according to Kyll, years. Vogel states (*op. cit.*, p. 272) that "some- mes even the very first attack terminates in death, and a seemingly per- ctly healthy child may be carried off in a few seconds." In a case uoted by MM. Rilliet and Barthez, death took place at the end of three eeks, and in another, in twenty months.

The *duration* is very uncertain. It generally, however, lasts several onths. In one of our own cases it lasted eighteen days, then ceased for ven months, returned, and proved fatal in five days. In another case, e attacks of spasms returned from time to time, during a period of ree weeks. In another case, the notes of which were obligingly fur- shed us by our friend Dr. Benedict, and which we shall append to this ticle, it lasted, in connection with contracture, four months and a half, d was followed by perfect recovery.

*Other Forms of Internal Convulsions.*—We have, for the sake of clear- ess, limited ourselves so far in the present article, to cases where the asm is confined to the muscles of the larynx, when the attack might be lled one of *laryngeal convulsion.*

In other cases, however, the spasm may affect, either solely, or in con- nection with the larynx, the diaphragm and the respiratory muscles of e abdomen and chest. The most common form of *internal convulsion*

muscles of the pharynx are involved, and there is
utter inability to swallow.

In some instances, also, the frequency, irregular
the pulse, and the irregular and tumultuous charact
heart indicate, as pointed out by Rilliet and Barthe
that the organs of circulation probably share in the

The degree in which the larynx participates in t
in different cases; at times there is no obstacle wha
or exit of air through its cavity, at others, the spas
extreme that the passage of air is entirely obstructe
cases, of which the one communicated to us by the l
quoted at the end of this article, is an example, resp
accompanied by a stridulous noise.

The above description applies to those cases of
where the convulsion is complete, and presents b
contraction and the subsequent clonic spasms of th

But in other cases, the attack consists merely of
of the diaphragm and respiratory muscles of the ab
lowed by a sudden and complete relaxation. The
the respiration during the spasm would of course
asphyxia, but fortunately the attacks, as we have
usually been so brief as not to cause any dangerous

These attacks are popularly known in this countr
in the last edition of this work, under the title of "*H*

We have met with a considerable number of well
affection, and believe it to be of quite common oc
happens that the physician is consulted in regard to
charge of children in whom it occurs, almost always
and think it of but little moment. It appears to be t
spasm of all the respiratory muscles, so that the chil
to breathe, from which circumstance, no doubt, it h

ild seems perfectly well, or else the attack is followed by excessive leness, with languor or prostration, lasting half an hour or even longer. e attacks recur with variable frequency; there may be several in a day, but one, or they may occur only at intervals of several days. The most quent cause of the paroxysms is contradiction. They are determined o by fright, pain, and crying. They never occur spontaneously, and ver during sleep, so far as we know. It is to be distinguished from yngismus stridulus by the absence of the crowing sound, by its not curring spontaneously or during sleep, and by the absence of carpo- dal or other spasmodic symptoms. It is, we believe, a spasmodic affec- n of respiration, analogous to, though not exactly similar to laryngis- us stridulus. We have never met with it except during the period of e first dentition, and always in children of nervous temperament. The ses that we have met with all recovered, and in one only did the life of e child seem to be at all endangered. In this instance the paroxysms d recurred very frequently for eleven months, and on two occasions re terminated by slight spasmodic movements of the limbs, lasting ly for a few instants, and unaccompanied by insensibility or other dan- rous symptoms. After these attacks the child was removed to the untry, where he recovered perfectly.

**Diagnosis.**—The only disease with which laryngismus stridulus is likely be confounded is spasmodic laryngitis, or false croup. From this it ay readily be distinguished by the absence of catarrhal symptoms, or ver; by the fact that the paroxysms occur indifferently in the day or ght, and that they are much more frequent; by the duration of the roxysms, which last only a few seconds, or more rarely a minute; by e absence of cough or hoarseness of the voice, even during the height the paroxysm; by the occurrence of tonic muscular spasms, and con- lsions; and finally by the chronic course of the malady: the converse all of which symptoms exists in spasmodic croup.

**Prognosis.**—The prognosis of laryngismus stridulus is always serious, nce even the mildest cases may terminate fatally in any one of the par- xysms. It is, however, far from being so dangerous a disease as has een supposed by some writers, and amongst others M. Valleix, who ates that it is almost always fatal (*Guide du Méd. Prat.*, t. i, p. 564). f 56 cases collected from Pagenstecher, Hachman, Ley, Kopp, Hall, onstant, Rilliet and Barthez, Kyll, and 5 from our own observation, aking 61 in all, 4 died of intercurrent or consecutive diseases, while of e remaining 57, 32 were cured, and 25, or about 43 per cent. died of the alady itself.

MM. Rilliet and Barthez quote from M. Lorent, the translator of Dr. eid's work, the statement, that of 289 cases collected from various riters, 115, or rather more than 39 per cent., proved fatal.

The prognosis given by the physician ought to depend in great measure pon the cause of the malady. When it depends on dentition, improper iet, or gastro-intestinal disease, the case will in all probability terminate vorably if the proper treatment can be, and is, brought to bear against hose morbid conditions; while if it occur under the influence of a centric

the least heat or swelling over the advancing
deems the use of the gum-lancet one of the most
ment we are possessed of, and recommends that
divided, "not once, or occasionally, but *twice*
another place, he says: "We should lance the
over a great part of their extent, *daily*, or *even*
sponge with warm water, so as to encourage the
recommends that in very urgent cases, the *lat*
prominent portions of the gum, should be scarifi
is undoubtedly a most important point in the tr
diseases of childhood, connected with dentition.
vinced, however, from personal observation, tha
tion merely because the child is passing through
is at least useless. We have never found it to
teeth are near enough to the surface to produ
tended with heat and soreness of the gums. So
insensible, not turgid, and of its natural color,
cutting has done no good.

When the disease depends on gastric irritati
healthy milk, or of artificial diet, our attention
pally to the removal of that condition. A wet-nu
at once if one can be obtained, and if the child wi
be done the diet must be carefully regulated b
milk or goat's milk ought to be used if they can
would recommend the gelatine diet prepared as
304. The proportion of the ingredients must be
tion of the stomach. If the digestive power be ve
of milk must be only a fourth or even a sixth f
amount of cream must bear its usual ratio to the

When the child is thin and pale, and the stom

ine, in the dose of half a grain, given in the same way. Another
excellent stimulant and tonic is the Huxham's tincture of bark, of
h about five drops may be prescribed in the place of brandy. This
l of treatment will scarcely fail to stimulate the digestive power of the
nach to greater activity after a few days, and of course to improve
nutritive functions and the strength of the patient.

Then the disease appears to depend on intestinal irritation, we must
iire carefully into its nature and causes. It may be connected with
stipation, diarrhœa, or with an unhealthy state of the contents of the
els. It is often dependent on the presence of crude or imperfectly
ested food in the alimentary canal, and when this is the case, the only
per method of treatment is to attend to the state of the digestive func-
ı, and to discover and employ a proper diet. The bowels are quite
uently very torpid, and the stools, when obtained by medicine, are
n found to be very offensive, light-colored, and pasty, conditions gen-
lly resulting from imperfect action of the liver. Under these circum-
nces small doses of mercurials, or taraxacum, should be resorted to in
nbination with or followed by mild aperients, as castor-oil or rhubarb.
e of the very best cathartic remedies, when this combination of symp-
ns is present, is Chaussier's mixture of castor-oil aud aromatic syrup
rhubarb, consisting of three parts of the former rubbed up with five
ts of the latter. The dose is a teaspoonful every two or three hours,
il the bowels are well evacuated. It is gentle in its action, and yet
y efficient, gives no pain, and is easily taken. If a mercurial be de-
d, about two or three grains of blue mass, one or two grains of calo-
l, or four grains of the mercury with chalk, may be incorporated into
ounce of the mixture. When diarrhœa is present, it must be treated
ording to its causes, as recommended in the articles on simple diar-
a and entero-colitis. When, on the contrary, constipation appears to
the cause of the disorder, this is to be treated by regulation of the diet,
the daily use of warm water enemata (particularly recommended by
M. Hall), or, if these do not answer, by the exhibition of small doses
he mildest aperients.

r. Hall states that by strict attention to the dentition process, and to
tric and intestinal irritation in the *dawn* of the disease, he has suc-
ded in curing all the cases he has seen but one, and in that he found
uration of the medulla oblongata.

y those who suppose the disease to depend on enlargement of the
mic, cervical, or bronchial glands, it has been proposed to endeavor
procure a reduction of the hypertrophy of those glands by frequent
lications of leeches, by the use of exutories upon the thorax, by the
ployment of strong purgative medicines, and by the administration of
rcury, digitalis, and iodine. In a case apparently connected with en-
gement of the bronchial or cervical glands, we should prefer to direct
treatment to the invigoration of the general health by attention to
t, by the use of tonics, and by proper exposure to fresh air, whilst we
uld employ internally, cod-liver oil, iron, iodide of potassium, the
parations of iodine, and antispasmodics.

zinc, which is recommended by M. Brachet (*Traité Pr* *vulsions dans l'Enfance*) as one of the best antispasmodi used in the convulsions of children, the fluid extract of preparations of belladonna, and aromatic spirits of harts chet always combines the oxide of zinc with extract of hy gives at least two grains of the former with four of the lat doses, in the twenty-four hours. He states that he has neve than ten grains of each in the period mentioned. Of the fl valerian, about a teaspoonful, or even more, might be given i four hours, to a child one or two years old. It should be water, of course. The aromatic spirits of hartshorn may be recommended above. We would also recommend the use of potassium in full doses.

It must never be forgotten, however, that remedies of to be employed only as palliatives and adjuvants, and not agents.

*Iron.*—Of all the remedies to be employed, after attending est manner to the removal of the exciting causes of the dise none of such almost universal applicability as iron or its The patient is almost invariably, owing to the faulty state tive and nutritive functions, more or less anæmical, a condi tively demanding iron; and as this remedy rarely conflicts wit means indicated, it should be given probably in all, or nearly al The metallic iron in powder or in lozenges, in doses of half a grain three times a day, or the iodide of iron in doses of from drops three times a day, in a mixture of syrup and cinnamon the best preparations, and they should be continued, as a ge throughout the treatment of the case.

*Treatment during the Paroxysm.*—When the child is attack paroxysm of difficult breathing, it should be lifted at once int posture if it be reclining, and fanned, or carried to an open e of ice, wrapped in a cloth, to the epigastrium and lower part of um.

munds (*Med. Times and Gaz.*, March 12, 1864) also found that ication of one of Chapman's ice-bags to the spine, did more than else to keep off the paroxysms in an obstinate case of laryn-

event congestion of the brain and effusion, which sometimes takes the effects of the attacks, Dr. Hall recommends a few leeches or the head, the application of an alcoholic lotion over the whole r the use of the ice-cap. At the same time the bowels ought to be ly moved by large enemata either of simple water or of water con- salt.

ases, especially of the more general form of internal convulsions, the attacks are so frequently repeated and severe as to threaten life, ld recommend the induction of partial anæsthesia by either ether roform, as advised in the article on eclampsia.

*oval to the Country.*—When the disease persists in spite of the above recommended, and especially when it depends on dentition estive irritation, change of air will often produce a wonderful effect, ould always be tried. The good effects of removal from the city country are strikingly shown in the case communicated to us by enedict.

### CASE COMMUNICATED BY DR. BENEDICT.

he subject of this case was a boy, born in July, 1845. He was a hearty child, and remained well until January, 1846, when his r's milk failed, and he was placed upon artificial diet. From this to May following, his diet was cream and water, barley-water, oat- arrowroot, pounded crackers boiled with water, and gum-water, all ich were tried in turn, being prepared and administered with the est caution as to time and quantity. A wet-nurse was tried, but the refused the breast entirely.

n the 27th January he was attacked with diarrhœa, which lasted eek. This was followed by constipation, the stools being white, tenacious, and offensive. The constipation continued up to July, it was replaced by diarrhœa.

ebruary 4th, 1846. On this day, the child being seven months old, first observed a spasm of the larynx, producing a shrill, croupal tle, or *ooh*, *ooh*, during two or three successive respirations, and fol- d by a cessation of breathing for some seconds, long enough to dash r in his face, carry him to the window, pat him on the back, &c. e spells occurred during the sleeping and waking state, and espe- y during crying or laughing, and continued almost daily and often y times a day and night until June, when he was taken into the try.

Simultaneously with the laryngeal spasm, appeared contractions of upper extremities, the thumbs being drawn tightly into the palms of hands, the fingers flexed over the thumbs, and the hands bent on the

pupils were contracted, and the hands firmly cle
was very loud, and attended every act of inspir
piration and circulation would be entirely susp
followed by great lividity of the surface and col

"Eight or ten leeches were applied behind th
warm water, and a dose of castor-oil adminis
saline enemata.

"Four hours from the commencement of the
were greatly aggravated; the wrists and fingers
spasms coinciding with the arrest of the circulati
was now perfect insensibility. The child was pl
water was applied to the head, and a sinapism
however, affording any relief to the crowing in
modic symptoms.

"At the suggestion of Dr. C. D. Meigs, the
its right side, with the shoulders elevated; this
at least six hours. At the end of that time the
improved, and accordingly, at the suggestion of
applied over the cardiac region; f℥i of lac. assaf
rectum, and a blister applied to the back of the

"The child expired at midnight, about ten ho
ment of the attack, the crowing respiration, wit
having persisted throughout.

"*Autopsy thirty-six hours after Death.*—M
larynx injected, but in other respects natural. T
half inches long, two and a half wide, and at its
of an inch thick; its weight was 620 grains, or 1
Lower lobes of both lungs greatly congested. H
unfortunately, could not be examined."

It will be observed that, in the above case, th
spasmodic symptoms appeared after slight cata

## ARTICLE VIII.

### CONTRACTION WITH RIGIDITY.

his is the disease called by the French *contracture.* We shall treat of idiopathic contraction with rigidity. It has been little known until in a few years, and yet is clearly not a *very rare* affection in Paris, the number of cases on record in different medical journals and ks. We have met with but one well-marked example of it ourselves his country. This case, of which we shall give a sketch at the end of article, and the one of laryngismus stridulus communicated to us by Benedict, and appended to the article on that disease, furnish very d examples of contraction coexisting with the former affection. We e seen also two other cases in which the contraction was decided, but which it lasted but a short time.

The disease is evidently one of the forms of eclampsia, which assumes h a variety of shapes during infancy and childhood. Though it genlly exists as an idiopathic and distinct malady, it is in other cases assoted with, or follows laryngismus stridulus or spasm of the glottis, and others again is combined with attacks of general convulsions.

**EFINITION.**—By idiopathic contraction with rigidity (*contracture* of French writers), is meant the involuntary tonic contraction of differflexor muscles of the extremities, particularly those of the fingers and s, but sometimes of the forearms and arms also, existing independly of any appreciable organic disease of the cerebro-spinal axis. It been described by different English writers in connection with larynmus stridulus, under the title of "carpo-pedal spasms," "cerebral asmodic group," "croup-like convulsions," &c., &c. We believe, hower, that it will be useful to describe it separately from that disorder, for ough of the same nature, and sometimes associated with it, it often ists as an independent affection.

**CAUSES.**—It is most common between the ages of one and three years. is much oftener sympathetic than essential, and its most frequent uses are dentition, disordered states of the digestive function dependt upon improper alimentation, anæmia and its accompanying nervous citability, brought about by digestive and nutritive derangements, eumonia, bronchitis, masturbation, and unfavorable hygienic condins. In some few cases, the disease is truly essential, since no pathogical cause for it whatever can be detected. It is merely necessary to y that it is often symptomatic of disease of the brain, but of that form the affection nothing will be said in the present article.

**NATURE OF THE DISEASE.**—It appears to consist in a functional deangement of the motor tract of the cerebro-spinal axis, occurring witht any cause that can be detected, or determined by the existence of me irritation affecting incident excitor nerves. We once saw a child years of age, who, after a restless, uneasy night, presented in the rning tonic contraction of the flexors of all the toes of both feet, so

motory system, caused a reflex motor action tl
muscular contractions. In other cases the d
motory system depends on the irritation of ex
the process of dentition, by indigestion, by diarr
&c. In other instances, again, to which the term
it seems to depend simply on general debility a
known to be productive of functional disease o

SYMPTOMS; COURSE; DURATION.—The disea
previously in good health, but generally thos
some disorder of the general health, or a seve
sympathetic, the first symptom noted is the con
the disease. When essential, on the contrary
marked by various nervous symptoms, such a
somnolence, which soon pass off, leaving the
rigidity as the only morbid condition. In most
begins with the muscular contraction, which gen
extremities first, and gradually extends to the i

When the disease is fully developed, the thur
the palms of the hands, and the fingers, strongl
phalangeal articulations, cover and conceal th
time that the metacarpo-phalangeal articulations
themselves remain extended and the fingers are s
The contraction generally affects the wrist-joint
are strongly flexed upon the forearms, and in s
upon the arms. The disorder usually affects
likewise, the toes being in a state of tonic flexi
rigidly extended upon the leg, and its point so
The spasm very rarely extends to the knees.

Children old enough to describe their sensatic
stiffness in the affected parts, with more or less s
the course of the nerves. The contracted musc

us stridulus, and likewise in our own case, the skin under the
ıbs had assumed the appearance of mucous membrane, from the long
close confinement of the member.

addition to the symptoms already enumerated as characteristic of
malady, there are others which require attention. The child is of
se unable to walk or perform any prehensile movement. The intelli-
e and senses always remain perfect in simple, uncomplicated cases.
nervous system shows signs of disorder in the form of restlessness
nguor, and irritability, with crying and peevishness. In the great
ority of instances, these are the only nervous symptoms, though in
e there are general or partial convulsions, strabismus, and diminution
ensibility. Of these the most frequent is convulsions, which gen-
ly come on a few days after the attack, or precede the fatal termina-
n. In the case of Dr. Benedict, referred to above, there were occa-
al choreatic movements of the face, arms, and body. The simple
ease is unaccompanied by any febrile movement, and the organic func-
as go on naturally. In the sympathetic form, on the contrary, we have
various symptoms of the disease which acts as the cause of the con-
ction, whether that be abdominal or thoracic. The most common train
symptoms, in young children, is the same as that which accompanies
stric or intestinal derangement, dentition, &c. The *course* and *dura-*
n of the disease are very irregular and uncertain. When once devel-
ed it may last from weeks to months, either slowly increasing in severity,
remaining stationary for a length of time. As a general rule, after it
s lasted for some time, it becomes intermittent, sometimes diminishing
even disappearing entirely for a period, then reappearing or increasing,
subside or cease again, and so changing without regularity or evident
use, until at last recovery gradually takes place, or death occurs from
e concomitant disease, or in a paroxysm of convulsions.

DIAGNOSIS.—The only difficulty in the diagnosis of idiopathic contrac-
n is to distinguish it from symptomatic contraction, or that which de-
nds upon cerebral or spinal disease. The kinds of cerebral disease
ich most frequently occasion contraction are tubercle of the brain, and
ningeal hemorrhage. The distinction can generally be made with con-
lerable facility, however, by attention to the various disorders of intel-
ence and sensibility, to the fever, constipation, vomiting, and different
des of invasion and progress which characterize the symptomatic form.
e following table, taken from MM. Rilliet and Barthez, will assist in
e diagnosis.

| SYMPTOMATIC CONTRACTION. | ESSENTIAL CONTRACTION. |
|---|---|
| Cerebral symptoms, special functional orders (convulsions, strabismus, dilata-n of the pupils, &c.), preceding or ac-npanying the contraction. | Similar cerebral symptoms, but only in exceptional cases, sometimes accompanying, but never scarcely preceding the contraction. |
| In many cases irregularity of the pulse. | No irregularity of the pulse. |
| Generally partial, and commencing ially in the elbows and knees, and in a gle extremity. | Binary, commencing in the fingers and toes. |
| Almost always permanent. | Remarkably intermittent. |

make a guarded prognosis.

TREATMENT.—The treatment must depend which the disease has made its appearance. V of an acute local affection, the treatment must proper for the concomitant disorder. When on gastric or intestinal derangement induced ment is the same precisely as that recommende dependent on the same causes.

It may be stated that, as a general rule, all ing, calomel, except in very minute doses cathartics, and blisters, can scarcely fail to be necessary in the treatment of the concomitant

It is proper in almost all cases to combine recommended, the employment of antispasmo when the contractions persist after the remova

The best remedies of this class are the wa belladonna; conium; the fluid extract of vale phor. The diet ought generally to be nutritio ticularly when the patient is weak and delicate

In conclusion we may state that the treatm the same as that proposed for laryngismus s refer the reader to that subject for more detail

### CASE BY DR. J. F. MEI

The subject of this case was a girl nine mont healthy persons, but the mother, owing to som but a poor nurse for the preceding child, and I therefore, at the birth of this one, to give it a done, however, and it was found necessary to f from its birth. During the early months of i attacks of disorder of the digestive system, but nastomosis, which had grown, by the age of nine months, to be as as a five-cent piece. It was deemed necessary to remove this tumor, accordingly, on the 11th of January, 1852, a surgeon tied it with a le and double ligature. The child bore the operation very well, was quieted, and was cheerful and ate well until the evening of the 15th, n it was attacked with fever, which lasted all night, and was accomed with a good deal of cough and some gurgling in the fauces. On following morning, at about 7½ o'clock, it had a slight convulsive ure, lasting a few moments, and marked by stiffening of the body, a staring expression of the eyes. In the middle of the day, it was ed again, and during that and the next day (17th), up to 10 P.M., it twenty-four convulsions. These lasted from three to eight minutes h; they were general, and consisted of flexions of the limbs, working the face, and were attended with unconsciousness. There was no sthotonos during the attacks, no extensions of the limbs, and no contion of the jaw. Between the seizures, the child nursed perfectly l, sucked the finger, had no stiffness of the lower jaw, and was perly conscious. There was, during these two days, some fever, as the n was too warm, and the pulse between 161 and 180. The respiration s more frequent than natural, there was a good deal of cough, some arrhal râles in the chest, and also some gurgling in the fauces. The ols were scanty, pasty, and white. There was a well-marked but rather ht rash on the limbs and trunk, like erythema or mild scarlet fever, l the lymphatic glands on both sides of the lower jaw were somewhat elled, and quite hard. The treatment directed was one-sixth of a grain calomel every two hours; two drops of solution of morphia with five of id extract of valerian, to be given also every two hours; warm immern baths, and mustard foot-baths. On the second day, blisters were plied behind the ears.

On the 19th the child was better. There was no convulsion; she noed well, smiled a little, nursed heartily, and took some arrowroot water. During all this time the tumor in the arm was not at all inflamed. It s neither red, sore to the touch, nor swelled. It was suppurating ghtly. Under the idea that the convulsions might depend in part on operation, and in order to promote suppuration, a warm poultice was ot constantly applied over the tumor.

The child continued better, with the exception of slight angina and ere cough, until the morning of the 22d, when it waked early, crying lently as though in severe pain, and I found the fingers of both hands ongly flexed at the metacarpal articulation over the thumbs, which re themselves drawn into the palms of the hands. The phalanges, ugh bent, as just stated, at the metacarpal articulations, were stiffly tended at the phalangeal articulations, and at the same time separated m each other. The hands were flexed at the wrists. The toes were ed, and the feet stiffly cramped at the ankles, and the insteps, as also backs of the hands, looked swelled and cushiony. Any attempt to en the hands was painful and caused crying. The pulse was frequent d small, the skin pale, and very slightly too warm; the intelligence was

℞.—Mass. Hydrarg., . .
Ol. Ricini, . . .
Syr. Rhei. Aromat., .

10 P.M.—Has taken three doses of t
whitish, pasty stool. Much easier. Has
not so strong, as the hands can be opene
pain. Skin soft, of natural temperature,
more doses of the mixture, and a repet
fœtida, in case of restlessness. During
separated. A process of ulceration is go
there is no inflammation of any conseque
there is neither redness nor soreness to t

January 30th.—The contracture dimi
and then returned, so that during the
very marked, the forearms being flexe
strongly flexed on the forearms. The
strongly flexed. The head was occasion
upon the trunk. The child evidently su
stantly and was very restless, except whe
or antispasmodics. The bowels are slug
by the oil and rhubarb mixture. The d
and pasty, but occasionally there was a he
the following mixture was ordered:

℞.—Ext. Valerian. Fluid., .
Sp. Ætheris Comp., .
Liq. Morph. Sulph., .
Syr. Tolutan., . . . .
Aquæ, . . . . .

A teaspoonful to be given every hour or two.

il, the expression was more placid and open, and the contracture uite so strong.

to February 7th, there was no decided change in the symptoms. continued quite as severe as before. The dyspeptic symptoms, the l state of the bowels, the want of appetite, and the white, pasty state evacuations were never relieved, except momentarily, by means of rtics. On the 7th a wet-nurse was procured, but only after the most vering and urgent solicitation and argument on our part, I having been convinced that the cause of the contracture lay in the disor- l state of the digestive functions, produced and kept up by artificial and perhaps by an unhealthy state of the mother's milk. The pa- , however, had always thought that the operation had been the cause e convulsive disease, and for a length of time would not consent to t-nurse.

fter the child had been suckled by the wet nurse for two days, the ls, which, since the beginning of the sickness, now twenty-three days, to a greater or less extent since birth, had been very unhealthy, be- e yellow, homogeneous, and natural in character; while the bowels, ead of being obstinately constipated, so as to require large doses of artic medicine, were moved spontaneously two or three times a day.

n the 10th we noticed strong divergent strabismus, and the child ed very badly. The left leg was drawn up, whilst the right was stiff- d. The left arm was more used than the right, the left hand being ied often to the mouth, while this was never done with the right. It difficult to measure the degree of the intelligence, but the child occa- ally looked at and evidently noticed objects, but during most of the it was dull and inattentive.

n the 13th there was an evident improvement, the previous night hav- been very good. The face was improved in color and expression, and not quite so thin. The contraction was about the same.

4th.—Some diminution of the contraction, the forearm being a little nded upon the arm, and the wrists, though still very rigid, not quite uch drawn. The child looks better; she nurses a great deal, taking hat the mother, and most also of what the wet-nurse, a hearty woman,

ebruary 20th.—Doing very well up to last night, when she became e restless, cried a great deal, rolled the head on the pillow, and had ht retractions of the whole trunk of the body. Occasionally she ceased ry, scarcely breathed, and the eyes were rolled upwards and fixed for ral seconds. She looked pale and pinched again, and refused to nurse. l one whitish, curdy stool.

1st.—Better; more quiet; nurses well. The boring with the head has ed, and also the retractions of the trunk. One healthy stool.

2d.—Much better; nurses well; one healthy stool. The contraction he right arm is yielding, and that of the forearm on the arm is gone oth sides. The left wrist is straight; the right one is yielding very h, though it is still somewhat bent. The fingers of the right hand, gh still bent, have relaxed very much; those of the left hand are still

March 1st.—Continues to do well. T
natural, being opened and shut, and use
looks a little stiff. Left hand much bett
finger, and grasps and holds toys with i
much contracted. The movements of the
There is no bending of the hands at tl
slightly in the left extremity. The feet a
ness. She now nurses very well, and is
fact, than before the sickness. The intell
she notices, smiles occasionally, and disti
between persons. The bowels are regul
taken no remedy of any kind for three da

March 11th.—Almost entirely recovere
only very slight flexion of the fingers of t
excellent.

March 29th.—The patient is now perfe
the forefinger of either hand rather bette
grasping and holding an object, she is mo
finger than with all. Still she can and do
ject is large, and no one, unless very obse
liarity just described. Embonpoint very
healthy; sleep sound; bowels in excellent c
smiles and laughs a great deal, and disting
a great deal of notice. She is about equa
eight months old. Does not attempt to sp

April 10th, 1852.—I was sent for to-d
well for three days, having had three or fo
day, with whitish specks in them. She wa
and had a good deal of loose catarrhal co
the breathing. I found her in the mornin
feverish, hot and dry, with frequent respir

ols being mucous, greenish, and containing small lumps of undi- caseine.

red a quarter of a grain of mercury with chalk diffused in a tea- ful of syrup of jalap, to be given every two hours.

P.M. there was a slight general spasm, with stiffening of the limbs traction of the head, lasting, however, only a few moments. This ed again in the afternoon. The dose of the mercury and jalap was d one-half in the middle of the day, as the quantity first ordered und to cause sickness and vomiting.

ning.—Rather better. No fever; some moisture of the skin; spasm hands very much relaxed. The diminished dose of mercury and was well borne.

a.—Rather better. Some fever still, with cough, gurgling in the , and distinct enlargement and hardening of the lymphatic glands angles of the jaw on both sides. There is still some contraction hands. Bowels open freely twice last night, and the stools better, of a pale yellow color, and more homogeneous. The jalap and ary to be suspended.

the course of the day there were two slight general spasms, with gismus. The latter occurred several times during the waking state, as not severe. Ordered three drops of syrup of ipecac., with four eet spirits of nitre, to be given every two hours.

h.—Much better. Contraction of hands almost gone; very slight ishness; cough less frequent and looser; respiration easy. No spasm y. Stools more healthy, yellow, homogeneous, and of natural tity.

th.—Continues better. Contraction slight. Cough diminishing very n.

th.—Rather pale, dull, and languid. Has had several attacks of gismus, one of which was quite severe, being attended with deep ness about the mouth, and some of the face also. Does not nurse so as formerly. The hands exhibit decided flexion of the third, fourth, fifth fingers at the metacarpo-phalangeal articulation, with stiffened nsion of the other phalangeal articulations. Thumbs slightly drawn the palms, and the forefingers rather extended. Bowels natural. Or- d fifteen drops of brandy, and a very small pinch of the Quevenne's llic iron in powder, three times a day.

th.—Condition about the same. On the 22d of March, the first wet- e, under whose charge the child had improved so rapidly, was changed, ccount of some objection to her personal appearance, and another procured in her place. This one was a healthy-looking woman, with enough, but she was red-haired, irritable, and excessively high- ered, and the child has been losing ground ever since her arrival. r the idea that her milk did not suit the child, a third nurse was by advice, obtained to-day (15th), a calm, placid, fat, and comfortable- ng woman, with an abundant supply of milk of ten months old.

th.—The child has improved very much. She is fatter already, has tented, tranquil expression, takes more than she did from the pre-

she was less forward in walking than n
might have been expected in one wh
long a time. Her intelligence was goo

February 5th, 1853.—We have seen
very good health, except that she is ra
at her present age. She has been wea
eats heartily and digests well most ordi
&c. The weaning was borne very w
rather deficient and capricious, for ab
the nurse. She can stand up when pla
walk feebly when well supported, but no
sitting posture. Her intelligence is, in
not talk as yet. There is no vestige of
when she is in good health; but any li
some contraction of one leg, and a sligh

Some months after this, the child was u
cough. She did well for several weeks,
a fit of coughing while seated upon t
doubtless from asphyxia, caused by co
spasm. This is the only case of ho
known to prove suddenly fatal in this
suppose that the fatal suspension of re
natural excitability of the sphincter m
previous attack of laryngismus stridulu

## ARTICLE

### TETANUS NASC

ntial nature from tetanus as it occurs in adults; though there are ny peculiarities in its causes and symptoms as to demand a special sion. This disease has also been described under the names of tris-ascentium or neonatorum, in accordance with the prominence and ncy of contraction of the muscles of the lower jaw: but as the spasm ly limited to these muscles, but usually involves the other muscles face and those of the extremities, the more comprehensive name of is seems more appropriate. It most frequently makes its appear-between the third and tenth days after birth, although there are on record in which it set in fifteen hours after birth (West), and s where it did not manifest itself until the twelfth or fifteenth day.

uses.—The causes which have been assigned for the production of us nascentium are very numerous; they may, however, be generally ed into the groups of *general* and *local*. Among the local causes, arious morbid conditions of the umbilicus and umbilical vessels hold ost prominent place. These are, however, far from being constantly nt, and yet the weight of evidence is at present in favor of regard-iseases of the umbilicus, and more especially of the umbilical arteries, casional causes of tetanus nascentium.

other cases, the disease has been attributed to some blow or acci-l injury which the infant had received. It is, however, still a vexed ion as to how much influence should be ascribed to these purely me-cal impressions in the production of this affection. One of the most rful efforts yet made to establish their importance was by Dr. Marion ,[1] who published a series of articles to prove that "trismus nascentium isease of centric origin, depending on a mechanical pressure exerted e medulla oblongata, and its nerves; and that this pressure is the t, most generally, of an inward displacement of the occipital bone." displacement is physiological during the parturient state, but its stence after birth is dependent, according to his theory, chiefly upon mproper position in which infants are allowed to lie, resting upon occiput for days together.

rther experience, however, has not confirmed this view, nor justified dmission of injury to the cranial bones into the list of common causes; et there are a few cases on record in which tetanus undoubtedly ap- to have been developed from this source.

NERAL CAUSES.—Vicissitudes of temperature appear to favor the lopment of tetanus, since it is frequent in many countries where a temperature during the day is succeeded by great cold during the . In the same way, exposure of the infant to wet and cold, as by ng damp clothes upon it, may be productive of the disease. The frequent and well-established cause of tetanus nascentium, however, vitiated state of the atmosphere; whether engendered by a filthy ition of the bedding or house, or by imperfect ventilation; and it is is that we must attribute the frequency of the affection in such dis-

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[1] mer. Jour. of Med. Sci., April, 1846, p. 368; July, 1848, p. 59; and October, p. 355.

The very great importance of filth and deficient of tetanus nascentium is, however, most forcibly duction in the frequency of this disease in large Lyi by the introduction of more thorough ventilation cleanliness. This was conclusively demonstrated Asylum towards the close of the last century. 1782, of 17,650 infants born alive in the asylum sixth, had died within the first fortnight, and in aln the cause of death was tetanus nascentium. Durin after Dr. Clarke had simply introduced a much mo ventilation in the wards, of 8033 children born, o about 1 in 19, or 5⅕th per cent.

Our comparative immunity in this part of Ame poor in our cities, is probably due to the greater d their houses, and to the improved construction of lums. In New York, however, according to Dr. S deaths from tetanus during the first year of life together.

The mortality returns of this city indicate that te paratively frequent among infants, is much less so t

Thus during the 9 years, from 1860 to 1868 inclus a total mortality (less still-born), at all ages, of 127, of 36,765. During this period there were 233 deat ages; 61 of which were during the first year of lif age. Thus the proportion of deaths from tetanus to was, after the age of one year as 1 to 598, and dur life, as 1 to 602.

During this same period, the number of births in Ph to 146,895.

PATHOLOGICAL APPEARANCES.—We have already a conditions of the umbilical vessels or umbilicus o nt than absent. In some cases, this congestion has led to an actual on of blood, either between the skull and dura mater, into the arach- cavity, or into the ventricles. In some cases, instead of hemorrhage, has been found serous effusion into the ventricles or into the sub- noid space, accompanied with a diminution of consistence of the ral substance, as reported by Matuszynski.

e morbid appearances found in connection with the spinal cord are same in character as the above, but more constant and even more ed. The vessels of the spinal meninges and of the substance of the are intensely congested, and there is frequently effusion of blood the cavity of the arachnoid.

e value of these appearances was formerly under-estimated from a sus- n that they might be partly, at least, due to the mere gravitation of the l after death. This suspicion has, however, been entirely removed he observations of Weber, of Kiel, and Finckh, of Stuttgardt, who d the bodies of infants dying with tetanus in various positions be- examining them, and yet invariably found the above-mentioned con- ns.

ere is, however, a further source of doubt as to the significance of lesions. We have already seen, in speaking of eclampsia, an affec- in which no appreciable material lesion has as yet been detected, in a certain proportion of cases, congestion, serous effusion, or actual rrhage might be present not as causes but as effects, and due merely e intense venous engorgement caused by the embarrassment of the ration and venous circulation during the convulsion. It is, indeed, ms to us, highly probable that a similar interpretation may be placed, ny cases at least, upon the morbid appearances above mentioned ing found after death from tetanus nascentium.

e have thus enumerated the lesions of the nervous system which are ly discoverable in many fatal cases of tetanus; and yet these lesions t will be observed, almost without exception concerned merely with ascular supply of the brain and spinal cord, and we are as yet with- ny accurate investigations into the condition of the nervous tissue . Within the past few years, the wonderful advances of micro- cal science, as applied to pathological anatomy, have revealed struc- changes in the nervous system in connection with more than one se, whose pathology has heretofore been utterly obscure, and it is o much to hope that at no distant period the question of the pres- of any definite structural change in the brain or spinal cord in cases anus nascentium will be positively settled. In connection with this stion, especially in consideration of the analogy between this dis- nd tetanus in the adult, we append the results of the investigations kitansky and Demme upon the microscopical appearances in the cord in fatal cases of this latter affection.[1]

The constant anatomical character of tetanus appears to be prolifera-

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Schmidt's Jahrb., vol. iii (in New Syd. Soc. Year-Book, 1864, p. 282).

tion of the connective tissue (of the cord); the most strik of this lesion is the extent over which it is found.

2. The product is a viscous mass, abounding in nuclei this stage of development in both acute and chronic cases. ing to the formation of fibres.

3. This change is found almost exclusively in the white m stance; the gray matter seems to suffer only secondarily, and compression rather than interstitial deposit.

4. The proliferation is not always followed by correspond of the white matter; it can often be recognized only by microscope.

5. It was principally found in the medulla oblongata, the the inferior peduncles of the cerebellum, and in the greater spinal cord.

6. This lesion of the connective tissue appears to be due tinued or repeated congestions.

7. The period at which it occurs, probably varies in differe

These observations, which were originally published ab been confirmed in all essential particulars by Wagner (S *Book*, 1862, p. 219); and still more lately by J. Lockhar published in the *Med. Chir. Trans.*, vol. xlviii, the results of scopic examination of the spinal cord in six cases of teta which structural lesions were discovered; and by Dr. Dick *Chir. Trans.*, vol. li, p. 265).

SYMPTOMS.—There are rarely any premonitory symptoms of but the onset and development of the disease are usually gra earliest symptom noticed is, in most cases, difficulty in nurs fant appearing anxious to nurse and eagerly pressing its mo the nipple, but being unable to fully take it into the mouth from a rigid condition of the masseter muscles. At the sa utters a whimpering, whining, unnatural cry.

The tonic muscular contraction very rarely remains limite masseters, but soon invades the other muscles of the face, a the trunk and extremities.

The expression of the face thus produced is indicative of g ing; though it is impossible to say how truly this represents tions of the patient.

The face is drawn into wrinkles and furrows, and has a stra ance of age. The condition of the mouth, however, is most cha the jaws are firmly fixed, the lips slightly separated and pres against the gums, and the angles of the mouth drawn backwa downwards, in the well-known risus sardonicus.

During this time, the other voluntary muscles gradually bec At first, their contraction can be overcome by the use of a mo gree of force, but in the course of twelve or twenty-four hours, of maximum rigidity is attained. The head is drawn backw firmly fixed; the arms are flexed, and the hands clenched, with t drawn across the palms. The thighs may be flexed upon the egs crossed; the great toes are usually adducted and separated from rest, which are flexed.

he contraction of the dorsal muscles frequently produces opisthotonos; the entire body is at times rendered so rigid that it can be raised, out bending, by placing a hand under the heels and head. This ex- e degree of spasm of all the voluntary muscles may never be devel- d in some cases; or, when present, it often is not persistent. When infant is quiet or sleeping, there is usually a certain degree of relaxa- . It is a marked peculiarity of the affection, however, that exacer- ons of the tonic spasm are produced by the slightest exciting causes, n effort at deglutition, a sudden noise, a puff of air, the most delicate ch, or even the alighting of a fly upon the surface. During these par- sms or clonic spasms, the muscular rigidity and contraction attain ir greatest height, and produce the most painful distortion of the face l limbs. The fit, according to West, may be ushered in by a screech. ring its continuance, there is serious interruption of respiration and culation; the surface becomes livid, and epistaxis may occur. It is ing this condition, too, that hemorrhages into the brain or spinal cord, their meninges, may result.

These paroxysms recur at irregular intervals, but usually, in fatal cases, ur with increasing frequency until either the child expires suddenly ing one of the fits, or passes into a state of coma.

The pulse does not present any characteristic change; in some cases it been found accelerated, but in others has continued normal, or has n fallen below the healthy rate.

The condition of the bowels is not uniform. Diarrhœa is frequently sent, but is probably due to irritation of the bowels from the irritating ure of the ingesta, or to some accidental cause; particularly as the vels are occasionally constipated in well-marked cases.

The appetite generally appears to continue, but we have already al- ed to the fact that any attempts to feed the child bring on violent spasms, ch expel the greater part of the food taken into the mouth. Owing cipally to this obstacle to the nourishment of the infant, the emacia- is more rapid and marked in this than in almost any other affection nfancy.

The state of the pupils in tetanus nascentium has not been noted with cient frequency or accuracy to allow any deductions to be drawn regard to it. Smith has seen the pupils contracted in the last stage he disease.

ROGNOSIS.—The majority of authors state that they have never met a case of recovery from fully established tetanus nascentium.

r. Smith has, however, collected 8 cases of recovery, in the histories hich he calls attention to two important peculiarities; that the chil- were all about a week old when the initiatory symptoms appeared, that there were fluctuations in the symptoms of the disease. The circumstances, then, which would lead us to form a less gloomy nosis than usual, are the late appearance of the disease, and the ness and intermitting character of the symptoms.

Broca, Vella, Chassaignac, and others. The dose in which this substance has been given, is from one-eighth to one-half grain

The great objection, however, to both this remedy and cann is the great want of uniformity in the strength of their preparati necessitates the utmost caution in their use.

More recently still, numerous cases of tetanus in the adult treated with the various preparations of conium, and with conia, and the results have been of a decidedly encouraging

Among the antispasmodics most frequently used, are assa tobacco, either given internally or by enema, or added to a There is no very positive evidence, however, of their efficien disease.

*Baths*, either of warm water or vapor, should be repeatedly tend to act favorably as sedatives, by relaxing the muscular in addition, excite the action of the skin.

The free use of large doses of quinine, usually in combination of the narcotics above mentioned, appears to be serviceable in tetanus, by reducing the frequency of the pulse and mitigating dency to spasm, so that the induction of cinchonism in tetanus tium is a measure worthy of a fair trial.

The application of ice to the spine has been highly recomm tetanus in adults, and is reported to have been used with several cases. The condition of the bloodvessels of the cord membranes, in fatal cases of tetanus nascentium, would certainly to indicate its use in this affection also.

Whichever of the above plans of treatment may be adopted never be forgotten that one of the principal dangers and most causes of death in this disease, is the obstacle offered to the of the infant. We must pay attention, therefore, to the adminis milk, meat-broths, and alcoholic stimuli in small quantities, but repeated; and if the rigidity of the jaw and the occurrence upon every attempt at deglutition, prevent the child from tak we should have recourse to anæsthetics to relax the spasmodic contraction, and enable us to get nourishment into the stomach.

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## ARTICLE X.

### CHOREA.

Definition; Synonymes; Frequency.—Chorea is a non-febri vulsive disease, characterized by irregular and imperfectly co-or but not completely involuntary contractions, of different parts of th cular system, and particularly of that of the extremities.

It is called also St. Vitus's dance, chorea sancti viti, chore epilepsia saltatoria, and by various other titles.

Vithout being very rare, chorea is certainly not of very frequent occur- ce. M. Rufz states (*Dict. de Méd.*, t. vii, p. 544), that of 32,976 chil- n admitted into the Children's Hospital of Paris in ten years, only 189 e affected with chorea, or 1 in 377. We have met with but nine cases rivate practice in the course of over twenty years' experience.

REDISPOSING CAUSES.—*Age.*—Chorea very rarely occurs during in- cy. According to M. Rufz, it is seldom met with between one and six rs of age, since of 189 cases, in only 10 did it occur within that period; ile between six and ten years of age it is much more common (61 in ) cases); and between ten and fifteen years still more so (118 in 189). I. Sée, in a valuable essay on chorea (*Mém. de l'Acad. Nat. de Médé- e*, t. xv, p. 373), and the relations of rheumatism and diseases of the rt, with nervous and convulsive diseases, states (page 448), that of l cases of chorea treated in the Children's Hospital at Paris, during a riod of twenty-two years, 28 were under six years, 218 between six and years, and 235 between six and fifteen years of age. M. Sée con- ides, after carefully sifting the facts, that the true maximum of fre- ency is comprised between six and eleven years of age, and that it rresponds especially to the tenth year. Under six years of age it be- mes more and more rare as we approach the moment of birth. MM. non and Constant, however, met with it in nursing children of twelve, , and four months of age.

The statistics furnished by Hillier[1] confirm these statements in every tail. Thus, of 422 cases treated as out-patients at the Children's Hos- al in London (where no patients over twelve years are received), the mbers at different ages were as follows:

| | | | | | |
|---|---|---|---|---|---|
| From 3 months | to 6 months, | 3 | From 6 years | to 7 years, | 48 |
| " 6 " | 12 " | 5 | " 7 " | 8 " | 51 |
| " 12 " | 18 " | 2 | " 8 " | 9 " | 58 |
| " 18 " | 2 years, | 4 | " 9 " | 10 " | 80 |
| " 2 years | 3 " | 6 | " 10 " | 12 " | 104 |
| " 3 " | 4 " | 11 | | | — |
| " 4 " | 5 " | 20 | | | 422 |
| " 5 " | 6 " | 30 | | | |

*Sex.*—It is much more frequent in girls than boys. Of the 531 cases ted by M. Sée, 393 occurred in girls, and only 138 in boys. This is the me result as that attained, M. Sée remarks, by Reeves, Good, &c.,—131 rls in 186 cases.

This excess of females over males obtains in chorea of every grade, om the mildest to the most rapidly fatal cases.

*Rapid growth* and the *second dentition* probably act, in a considerable gree, as predisposing causes of the disease. Particular attention is awn to these conditions by MM. Rilliet and Barthez, and the precise e at which it is most frequent (between six and eleven years), would em to show that they exert a very positive influence. The general de- ioration of the health, resulting in anæmia, and the exaggerated nervous-

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[1] Diseases of Children (Amer. ed., 1868, p. 234).

chorea consecutive to chronic diseases that have produc
condition of the economy, . . . as chlorosis, anæmia, an

*Constitution* does not seem to exert much influence ir
though it is generally thought to be most apt to occu
delicate, excitable, and nervous temperament. The beli
predisposition seems to be unfounded save in rare case
appears to commence more frequently in summer than in
it is scarcely known in tropical climates.

*Rheumatism*, however, is unquestionably the conditio
with which chorea occurs far more frequently than wit
perhaps than with all others conjoined. The evidence of
experience is unanimous upon this point. M. Sée (*loc. ci*
much examination of this subject, that one-half the cas
dependent upon the rheumatic poison. Thus of 109 case
admitted into the Hôpital des Enfants, he found that 61 w
with chorea. Trousseau[4] also states that in his experie
was undoubtedly the most marked cause of chorea. M
asserts their connection even more strongly, and states
cidence of chorea and rheumatism is so common a fact
be regarded as a pathological law, just as much as the
heart disease and rheumatism."

In England, also, this connection between rheumatism a
of the mild and severe or fatal form, is positively state
authorities. Thus in 104 cases of the list collected b
"where special inquiries were made respecting rheum
affections, there were only 15 in which the patients were
cardiac murmur, and had not suffered from a previous
matism." Hillier (*op. cit.*, p. 236) "believes there is a ve
tion between these diseases." West (*op. cit.*, 4th Am. ec
"Be the exact relation then what it may, it does seem
tism, or the rheumatic diathesis, is a very powerful pre
of chorea." Dr. H. M. Tuckwell, in a valuable article[7] or

chorea, strongly upholds their frequent connection, and cites 17 cases his own, in 11 of which the previous occurrence of rheumatism was lowed, while it was denied only in 6.

Dr. Chambers found that out of 33 cases of chorea in his books, in 6 e affection either began during rheumatic fever, or followed immediately ter it, or else rheumatic fever succeeded to the chorea. In 80 cases of n-fatal chorea recorded by Ogle,[1] it appears that in 8 cases rheumatic ver had existed.

On the other hand, several German authors of high authority do not tach so much importance to the causative influence of rheumatism in orea. Thus Romberg[2] states that he has not observed their connection equently; and Vogel[3] states that, "although it must be acknowledged at chorea may succeed to acute rheumatism, still the frequency of the ccurrence has been very much overestimated."

Steiner[4] also states, that out of 252 cases of chorea, the disease ensued uring the decline of acute articular rheumatism in but 4 cases; of 3 fatal ases, however, reported by him, one was complicated with rheumatic eart disease.

We must also allude to the argument of Vogel (*op. cit.*, p. 399), that there were any actual connection between these diseases, then more irls than boys ought to suffer from rheumatism; for it is well known that e former are predominantly subject to chorea. "Just the reverse haps to be the case in rheumatism, which notoriously attacks more boys an girls." We have already quoted extensive statistics, which prove e truth of the first of Vogel's statements; but we are by no means nvinced that the latter is correct, and that rheumatism is more frequent boys than in girls. On the contrary, the statistics quoted by Tuckell (*loc. cit.*, p. 102), go to show that the reverse even may be the case. hus during sixteen years there were admitted to the Children's Hospital London 478 patients with rheumatism, 252 of whom were females, and 26 males.

We are not aware of the existence of any accurate statistics of the isease in this country, in regard to this point.

The great weight of evidence, however, which has been accumulated in vor of such a connection, appears to us to leave no doubt that in a nsiderable proportion of cases, though by no means in all, chorea in me way depends upon the existence of rheumatism, or the rheumatic iathesis. We shall have occasion to call attention to the obscurity which equently attends the manifestations of rheumatism in young children; nd it is, therefore, highly probable that in not a few cases of chorea, here, on inquiry, the parents deny the previous occurrence of rheumasm, the truly rheumatic nature of some acute febrile attack, with which e child may have suffered months before, has been entirely overlooked.

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[1] Brit. and For. Med. Chir. Rev., April, 1868, p. 490.

[2] Dis. of Nerv. Syst. (Syd. Soc.), 1853, vol. ii, p. 57.

[3] Op. cit., p. 399.

[4] Prag. Vjrschr. xcix (xxv, 3), p. 43, 1868; in Schmidt's Jahrb., Bd. 142, No. 4, 69, p. 26.

in 25 out of 128 by Sée, in 9 out of 31 by Peacock, and i
Hillier. Besides this are cited imitation, blows and falls
fits of violent anger, contrarieties, masturbation, the di
ment of the menstrual function in girls, or suppression o
the sudden drying up of ulcers or eruptions, and, in female
pregnancy, which indeed is a well-ascertained and most i

Chorea has also been observed in the course of, or as a
ous acute diseases, as pneumonia, the eruptive, typhoid, a
fevers, and affections of the gastro-intestinal tube.

Anatomical Lesions.—It would appear that as yet we a
with any truly characteristic lesion in chorea. In many
autopsies, it is stated that no lesion either of the cere
or any other viscus was present. As, however, most of
were made before the improved methods of microscopic
the nervous system were introduced, they cannot be rega
sive upon this point. In many cases also, the examination
has been too superficial to have led to the detection of m
tive and important lesions. Upon the whole, therefore, i
said, that it is chiefly the examinations which have been m
past few years which are of real value, and that there is s
merous accurate autopsies, before we can consider oursel
speaking of the true lesions in chorea.

It is evident that the determination of this question pres
culties, apart from the fact that fatal cases of chorea are
rare, and that it requires an amount of skill and patient
command, to make the examination with the requisite mi
of these difficulties consists in the fact that, although ch
as a special, individual affection, there are numerous othe
vous disease, which are of very varied nature, but which

mong these are enlargement of the odontoid process, effusions into arachnoid, tumors in the substance of the brain, abscess in the cere-um, bony plates upon the spinal meninges, and many other entirely onnected lesions.

n the other hand there are cases on record, in which careful examinan has failed entirely to detect any material lesion, either of the nervous tres or of the other viscera, and in which the choreic movements were bably of a reflex character.

)f late years, however, since this question has been subjected to more quent and critical examination, there are certain lesions which have n found so frequently after death in fatal cases of true chorea, that y must be regarded as possessing some definite connection with the ease. These lesions consist in certain morbid conditions of the heart, l of the nervous centres.

In regard to the lesions of the *heart*, M. Sée (*loc. cit.*, p. 390) states, er a careful examination of eighty-four autopsies, that "in most of the es, and especially in those most strongly attested, chorea is the result the rheumatic diathesis, and that it reveals itself by plastic inflammans of the cardiac membranes, of the pleura, and of the peritoneum, th or without articular rheumatism."

Bright, Copland, Todd,[1] Kirkes,[2] Nairne,[3] Begbie,[4] were also among the st to call attention to the frequency of rheumatic endocarditis in conction with chorea. In an interesting article on "Maniacal Chorea,"[5] ickwell gives an analysis of the lesions in 34 fatal cases of chorea colted by himself. In 25 of these the endocardium was found diseased, e presence of warty vegetations on the valves being especially alluded in 20. Of the remaining 9, no mention is made of the heart in 5, and is reported as healthy only in 4. The pericardium was found diseased ly in eight of the 34 cases.

In Ogle's fatal cases (*loc. cit.*, pp. 208 and 507), there were in 11 out of instances more or less fibrinous deposit or granulations upon the lves or some part of the endocardium. In 2 cases only was the perirdium diseased. In the 14 fatal cases collected by Hughes (*loc. cit.*), getations were found on the valves of the heart in not less than 11.

The results of careful auscultation, during life, come to support those post-mortem examination.

Hillier states (*op. cit.*, p. 236) that, "of 37 cases in my note-books ere was probably organic disease of the heart in 25, and in 4 others ere was evidence of functional derangement, whilst in 8 only was there sign of cardiac disturbance."

Jules Simon writes from a large experience, and says: "I have been most always able to detect well-marked evidence of cardiac affection chorea, in the shape of organic murmurs, hypertrophy of the heart,

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[1] Lumleian Lectures, 1849.

[2] Medical Gazette, 1850.

[3] London Jour. of Med., 1851.

[4] Edin. Med. Jour., 1852.

[5] Brit. and For. Med. Chir. Rev., Oct., 1867.

hair brush; and it has been supposed by some obs
Barnes, that they consisted merely of the fibrin of t
in the agony of dissolution. We believe, however,
vious occurrence of valvular murmurs in cases where
have been found, as well as from a careful study
descriptions of their appearances, and the occasion
positive results of embolism, that these vegetations
process of endocarditis.

We will, however, discuss the question of their conn
when we come to speak of the nature of that disease.

In regard to the condition of the nervous system in f
there is at times no lesion appreciable, even on mi
tion, while on the other hand there is not unfrequent
either of the nervous tissue or of the meninges.

Thus, in the 14 fatal cases collected by Hughes, the
in 4, only congested in 3 cases; there was softening of
without opacity of the membranes and serous effusio
seventh with opacity and congestion of the dura mate

In 11 of the 35 fatal cases, collected by Tuckwell, t
softened, and in 9 only is it reported as healthy. I
reported by Ogle, the brain was healthy in 6, much c
ened in but 1, and anæmic in 1 also.

It appears, therefore, that in a notable proportion
record, positive organic disease of the brain, and esp
of softening, has been discovered. In a few instances e
sion of the vessels by fibrinous masses, has been obse
carotid artery (Ogle), or in the minute arterial branches
of softened brain-tissue (Tuckwell). We need, howe
of careful observations to determine more positivel

the 16 fatal cases reported by Ogle, its tissue was congested in 5;
was slight softening in 2; in 1 the upper dorsal region of the cord
completely broken down and almost diffluent. In 2 cases the cord
examined by Mr. J. Lockhart Clarke, who found in one (*loc. cit.*, p.
that "in the lower part of the dorsal region, at the ninth dorsal
es, the anterior columns were swollen, and formed a convex protu-
nce of considerable size. In a transverse section of the cord carried
ugh this part, and examined under the microscope, it was very evi-
t that extensive morbid changes had been going on, the white sub-
ice had been softened, . . . and in two or three places there were
umscribed effusions of blood, surrounded by granular exudations,
ch had probably occurred before the effusions." Similar appearances
e discovered in the lower dorsal region in the other case (*loc. cit.*,
07).

n a case, already referred to, observed by Tuckwell, of rapidly fatal
niacal chorea in a lad of seventeen years of age, in addition to several
ches of embolic softening of the brain, there was marked softening of
spinal cord in the middle dorsal region.

n 3 fatal cases reported by Steiner (*loc. cit.*), there was increase in the
nective tissue of the spinal cord; serous effusion in the spinal canal;
l congestion or effusion of blood in the membranes at the exit of the
ves.

inally, in the cases where embolism of the brain was observed by
ckwell, there was also minute embolism of the *kidneys*.

n a case of fatal chorea, reported by Monckton,[1] embolism of one brach-
artery occurred, and, after death, large vegetations were found on the
tic valves.

We will have occasion to refer again to these various anatomical ap-
rances when speaking of the nature of chorea.

SYMPTOMS; COURSE; DURATION.—The disease may be general or par-
l: in the first case it affects all the limbs, the face, and some of the
scles of the trunk; in the second it implicates only one side, the upper
tremities, or a single member. It happens not rarely that the choreic
vements are limited to one side of the body: thus in 80 cases of non-
al chorea, reported by Ogle (*loc. cit.*, p. 488), the right side alone was
ected in 24, whilst the left alone was affected in 20; and in 25 both
es were affected, though in some instances one or the other side was
re involved than the opposite one. Of 7 cases that we have seen, in
ich this point was noted, it was general in 4, and confined entirely to
right side in 1, and to the left in 2. We shall describe first the pro-
omes of the disease, then the invasion, and afterwards the symptoms
they exist in fully developed cases.

*Prodromic Symptoms.*—It is doubtful whether there are, as a general
le, any well-marked prodromic symptoms. The only ones that have
en mentioned with any authority are irritability and peevishness of the
nper, an unusual degree of impressibility, languor, debility, disturbance

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[1] British Med. Jour., 1866, No. 805.

In most cases, however, it begins with some unu ments in one of the upper extremities, and as a The choreatic movements are often observed firs the same time or soon after, in the face. Sooner in severity, and extend to the other arm, to the l and the disease is fully developed.

*Symptoms of Confirmed General Chorea.*—Wl come fully confirmed the movements are excee irregular. The limbs are agitated by involunta muscles into every attitude possible for them to as opened and shut, brought together or separated, v The hands are flexed and extended upon the fore supinated, whilst the forearms are flexed or extenc the arms moved at the shoulders into every imagi are the irregularity and rapidity of the motions tha difficulty that the patient can seize anything with once the object is attained, he frequently cannot do This imperfect control over the hands and arms se patient from carrying food and drink to the mout utmost difficulty, and may make it necessary to fee

The inferior extremities are affected in the sa Walking is always more or less difficult, and in s practicable. The patient totters from side to sic short distance, and then suddenly stops. Sometim complished in a zigzag direction, and at others by were, whilst in others again, the walk is rapid and The child often falls while walking or running, ei slight obstacle, or in consequence of the irregular ar action. In some instances standing is impossibl suddenly under the weight of the body. It was n irregular and dancing movements of the inferior e attempts to walk and stand, that gave to the diseas St. Vitus's dance.

ed, or moved in a lateral direction, and with such violence perhaps injure the tongue or teeth. In consequence of the irregular mo- of the tongue and mouth, articulation becomes difficult and the either stutters, or speaks slowly and badly, or can pronounce only syllables. In a case that occurred to one of ourselves, the move- s of the mouth and tongue were so violent and uncontrollable that atient, a boy nine years old, lost for three weeks all power of speech. as at the same time unable to open or shut the mouth at will, or to ow at the proper moment, so that in the act of feeding him, which me necessary from his entire want of control over the arms, the food constantly spilled and spluttered about as though by an idiot. The f mastication also was quite impossible, so that he could take nothing luids for a number of weeks. In another case also that occurred to one rselves, in a girl between eight and nine years of age, and which more- was a relapse, the patient exhibited the same inability to feed her- and the same difficulty in regard to mastication, so that she had to ourished for several weeks on soft food. The speech was likewise tly affected, it being very difficult to understand her muffled, thick, indistinct utterance.

hilst the face and limbs are contorted as above described, the head oved rapidly from side to side, or backwards and forwards, or under- constant rotation, and, in some instances, as in two that came under wn notice, all power over the muscles of the back of the neck is lost, the head falls from side to side, or forwards, as in an infant. In e cases the choreatic movements affect the trunk also, so that the nt cannot lie upon a bed, but rolls and twists about the floor with violence as to bruise and excoriate the skin. Deglutition is some- s slightly embarrassed, and the child is obliged to swallow with great ity; in some few cases a peculiar loud cry, like that which occurs in ria, dependent apparently upon spasm of the larynx, has also been rved. The muscles of the external and internal respiratory appa- are rarely affected, though Romberg narrates three remarkable nces, in which dyspnœa, loud whistling respiration, spasmodic con- ions of the glottis, or hiccough, were present. Occasionally irregu- ction and palpitation of the heart are observed, and have been attrib- to chorea of its muscular structure.

some cases, also, the sphincters of the bladder or rectum are par- paralyzed. Retention of urine has been noticed in a few cases; on the other hand, the late Prof. William Pepper mentions having n incontinence of urine to alternate with chorea of the external les.

e disease is unaccompanied by pain unless it be attended with some lication, and what is very singular and remarkable, the constant and very violent muscular contractions do not seem to occasion fatigue. ere is, however, frequently evidence of a want of muscular power, may merely amount to an unusual susceptibility to fatigue on vol- y exertion; or complete paralysis may be present, especially in the of hemiplegia, in cases of unilateral chorea.

irritable and capricious. General and special sen
main natural; though in some cases, impairment of
the parts most convulsed, even amounting to anæst
simple, uncomplicated attacks, the pulse, as a rule,
appetite is preserved; there is no unusual thirst, and
regular.

The *urine* has at times been observed to be of ur
gravity, and to contain an excess of urates and oxa
tions do not, however, appear to be at all constant o

In a considerable proportion of cases of chorea (s
551), a bruit is heard on ausculting the heart, usua
not very great intensity. In some cases this is unc
vegetations so frequently found on the valves of the l
but in others it appears to be rather due to the anæmi
and in those cases where palpitation exists, it may l
lar contractions of the walls of the heart. It has al
these murmurs in chorea are often transitory, and ev

It is said that idiocy is apt to occur in cases whic
of years.

The *course* of the disease is acute or chronic. In
cases it is acute, the symptoms becoming more and
they reach their height, when they remain stationary
subside and disappear under the influence of treatme
course of the malady. It has been frequently noticed
febrile or inflammatory disease is developed during t
the spasmodic movements are very apt to diminish
the time. In fatal cases the symptoms are constan
movements become so violent as to make it necessary
in bed, or in a strait-jacket; the patients, deprived of
and emaciated; the respiration becomes difficult;
ished; the pupils are contracted; and the child dies.

The *duration* is irregular, varying in acute cases be
months. The average duration is probably about six

observed by ourselves. In one of these the relapse was much worse he first attack. It was one of the most violent and prolonged that ve seen. MM. Rilliet and Barthez state they occurred in six out ieteen cases seen by them. The relapses in these cases occurred twice, and three times. M. Sée (*loc. cit.*, p. 408), says that it is not nmon, after some weeks of respite, or several months of apparent ery, to see the disease reappear with renewed intensity, and be thus ted twice, thrice, and even seven times in succession. Out of four nts, at least one, he states, remains thus under the influence of the se. Of 158 cases he counted 37 relapses, of which 17 were arrested the second attack; 13 suffered a third, and 6 a fourth attack; and , one had seven distinct seizures, each one of which was separated the following, by a well-marked interval. In 46 of Ogle's cases in h this point was noted, previous attacks had occurred in 25; in 5 of h there had been 2 previous attacks, and in 1 no less than 7.

ATURE OF CHOREA.—In considering the essential nature of chorea, it ident that there are two points of importance to be determined, ely, the precise portion of the nervous system involved, and the re of the morbid change in this part.

fore alluding to the views which have been entertained in regard to irst of these questions, we would refer to the very great irregularity h exists in different cases in the extent and distribution of the cho- movements. Thus it frequently happens that the disease is strictly ned to one or the other side of the body, or it may be entirely sym- ical. In other cases the muscles of the head and neck may almost or escape, while both legs and one or both arms are affected. Or, on ther hand, the choreic movements may first appear and remain most re in the muscles of the face, mouth, and tongue. It seems probable , therefore, that there is no one special portion of the motor centres h is exclusively the seat of lesion in all cases of chorea. In the great rity of cases, however, the symptoms are so far uniform that the les of the face and tongue, as well as those of the extremities, are ted, and the only peculiarity is that the irregular movements may nfined to one or the other side, a circumstance susceptible of ready nation.

rshall Hall considered chorea as an affection of the true spinal sys- and possibly in some cases where the choreic movements are limited e extremities and symmetrical, this supposition may be correct.

the vast majority of cases, however, it is undoubtedly necessary to e the seat of disturbance in chorea at a higher point in the cerebro- l axis, one above the decussation of the anterior pyramids, and bly in or near the corpora striata. Among the arguments which to this view, many of which have been advanced by J. Hughlings son[1] and Broadbent,[2] who strongly uphold it, may be stated the fol- g: That the muscles of the face are very frequently affected by the

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[1] eynolds's Syst. of Med., Art. Chorea, vol. ii, p. 127, foot-note; and Med. Times az., March 6th, 1869.

[2] ritish Med. Jour., 1869.

view. The affection of one-half the body would alo
above the decussation of the pyramids as the seat
supposition of Carpenter and others that the cerebel
disturbance in chorea, was based upon the view that
the chief power of co-ordinating muscular movement
into the functions of the cerebellum, as well as the a
been adduced above, render this supposition untena

The further question now remains as to the cond
affected part of the motor centres is brought, in
phenomena of chorea. And it is especially in rega
the investigations of Jackson and Broadbent, above
much value. These pathologists, and particularly t
attention to the fact that the choreic phenomena are
of the seat of the disease, and that the only essenti
production is an impairment of vigor and instability
ganglia, a condition which may probably be induced

We are now prepared to consider the manner i
causes of chorea may be supposed to act.

We have already seen that in a certain number of
Sée, sixteen in eighty-four) chorea is independent
lesion of the nervous system. In some of these cas
the impaired nutrition of the motor centre may res
and anæmic state of the blood; and, indeed, it app
reasonable to explain a certain class of cases of chore
to apply the same explanation to analogous cases of

It is probable, also, that in another group of ca
*reflex* in character, and depend upon a different deg
action upon the motor centres which produces reflex
by exhausting their excitability or by causing a reflex
sels. This view is maintained by Broadbent (*loc. cit.*)
cliffe,[1] who states that irregular choreic movements m
only by injury of certain parts of the nervous syste
certain nerves at a distance from the nervous centres.

s in the intestinal canal) and where it is seated in immediate con- on with the nervous centres. As instances of the latter kind, may ggested such conditions as thickening of the meninges of the brain inal cord, and the presence of bony spiculæ developed in the me- es.

nally, we must admit as a cause of chorea, primary alterations of the e of the sensori-motor ganglia and adjacent parts; the degree of dis- not being so great as to abolish entirely their function and produce lysis, but only sufficient (as for instance would be secured by an early e of softening) to weaken it and render it unstable.

will be seen from the foregoing remarks that we deem it impossible, ast in the present state of our knowledge upon the subject, to con- r the cause and mode of production essentially the same in all cases norea, and that we are disposed to admit the existence of cases due to e anæmia and impaired nutrition, or to an altered state of the blood; ases due to reflex irritation (in both of which classes of cases, some mi- and as yet inappreciable lesion may exist); as well as of cases which due to primary material alterations of the sensori-motor ganglia.

e have already, in considering the causes and anatomical appear- es of chorea, had occasion to dwell upon the close connection which ts between it and rheumatism, and before leaving the present subject desirable to refer to the various explanations which have been offered his circumstance. Among these, the most important and interesting hat of Kirkes,[1] who, noticing the frequent presence of vegetations n the valves of the heart in fatal cases of chorea, was led to suggest very small fragments of fibrin might be detached from the valves, entering the circulation cause temporary obstruction of the minute llaries of the nervous centres, producing irritation and impaired nu- on. This theory, which attributes the production of chorea to em- sm, has been accepted by J. Hughlings Jackson (*loc. cit.*), by Savory,[2] uckwell (*loc. cit.*), and, in part at least, by Broadbent (*loc. cit.*).

is supported strongly by the facts that continued observation of s of chorea has shown even more clearly the very frequent existence ardiac murmurs during life, and of vegetations upon the valves after h; that complete paralysis, usually in the form of hemiplegia, fre- tly follows the choreic movements; that in many fatal cases there is d just such cerebral softening as follows embolism; and, finally, that few cases, already referred to, the existence of embolism has been lly demonstrated.

here have, however, been numerous objections advanced against this ry, the most powerful of which are urged by Barnes (*loc. cit.*) and (*loc. cit.*). Thus it has been objected that, on the supposition of erous minute fragments of fibrin circulating in the blood and becom- mpacted in the minute capillaries, it would be difficult to explain the hat chorea is so frequently unilateral, or even localized in a single p of muscles. It must be remembered, however, in answer to this, not only that in some cases of fatal chorea embolism of sin rial branches has been found, but that the number of minute of fibrin detached from the heart's valves may be very small is quite supposable that they should nearly all pass into the or less frequently the left carotid artery, and thus be chiefly to one side of the brain. It may be mentioned also in this that it is especially in these cases of unilateral chorea that is succeeded by paralysis, such as might readily follow in bolism.

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[1] Med. Times and Gaz., 1863, vol. i, pp. 636 and 662.

[2] St. Barth. Hosp. Rep., vol. i, 1865, p. 107.

Again, it has been objected that if chorea be invariably upon embolism, the results of this accident must be of a very and trifling character, since in so great a majority of cases terminates in complete and permanent recovery. The objection must be admitted, and yet Tuckwell fairly remarks it, that the "mere fact of recovery is not enough to condemn of embolism. On the other hand, the very frequent presence of murmur, even in the milder attacks of chorea which recover, dispose me to look for the same exciting cause in the milder severe cases, viz., embolism."

Another objection advanced by Ogle (*loc. cit.*, p. 232) is, that cases of capillary embolism the symptoms produced are not rea, but rather of pyæmia or of gangrene. It is quite evident that these symptoms alluded to (which are met with for instance ative endocarditis) are due, as remarked by Savory and Tuckwell to the mere capillary embolism, but to the concomitant septic of the blood.

This extremely interesting question cannot be considered as settled; there is still needed a series of careful examinations in the various points under discussion. It appears to us, however, sively shown that, in a certain number of cases, the peculiar and impaired nutrition of the sensori-motor ganglia, which leads development of the choreic phenomena, are due to embolism of sels supplying these parts. We have, however, already express opinion that, at present at least, there must be admitted two other of cases of chorea, due primarily to alterations in the blood reflex irritation respectively. It is quite possible, therefore, that instances rheumatism induces chorea indirectly, either by causing and impaired nervous vigor, or by causing inflammatory lesions the spinal meninges or sheaths of spinal nerves, which may serve foci of reflex irritation.

**Diagnosis.**—The diagnosis of chorea cannot be attended with culty, and we shall therefore make no remarks upon it.

**Prognosis.**—Idiopathic simple chorea in young children is fatal disease. Nevertheless, even under these circumstances, it terminates fatally, and usually from exhaustion. Thus MM. Rufz, dre, and Rilliet and Barthez have each met with an instance. (*loc. cit.*, p. 406) states that of 158 cases, 4 passed into the chronic dition, and 9 proved fatal. Dr. Copland states that he has met s, that Dr. Prichard has recorded 4, and that Dr. Brown refers practice; but he does not inform us whether they were idio- iplicated, or symptomatic. We have already referred to the tal cases, of which the autopsies were reported by Dr. Hughes nd to the 34 additional fatal cases collected by Tuckwell (*loc.* . W. Ogle has lately (*Brit. and For. Med. Chir. Rev.*, January 1868) published the details of 19 more fatal cases; and from the e we quote the following table as exhibiting the mortality from in Great Britain during 23 years.

| | Deaths from Chorea. | | Deaths from Chorea. |
|---|---|---|---|
| | 54 | 1855, | 69 |
| | 25 | 1856, | 59 |
| | 28 | 1857, | 44 |
| | 19 | 1858, | 58 |
| | 39 | 1859, | 55 |
| | 38 | 1860, | 66 |
| | 34 | 1861, | 71 |
| | 60 | 1862, | 52 |
| | 77 | 1863, | 63 |
| | 73 | 1864, | 73 |
| | 67 | 1865, | 88 |
| | 48 | Total during 23 years, 1255. | |

e possible, however, that many cases of organic disease of the stem merely attended with irregular choreoid muscular move- been included in these reports. On the other hand, out of ths at all ages occurring in this city during seven consecutive 3 are attributed to chorea. It must not, however, we think, ly inferred from this that severe and fatal chorea has been re among us; since, during the same time, there are reported to the deaths from convulsions, 79 deaths from cramps, a most improper term, which, in all probability, includes a cer- rtion of cases of chorea.

d to any special rules in prognosis to be deduced from a study l cases, it may be observed that their average age is consider- r than that of ordinary mild chorea. Thus in 17 out of Ogle's ses, but two were under the age of ten; the average being rs.

32 of Tuckwell's 34 fatal cases, 21 were at or above the age , and 6 of this 21 were at or above the age of twenty.

ation of the case scarcely seems to have a direct bearing upon . It is true that in cases which have passed into the chronic ersisted for several months, the prospect of being able to effect cure diminishes, but still such patients may live very many ultimately die only from some intercurrent disease. And, on and, death has been known to occur as early as the end of the Of course the existence of any serious complication, and pecially of marked cardiac disease from previous rheumatic nders the prognosis unfavorable.

In conclusion, whenever, in a case of chorea, the convulsi become incessant, and the respiration embarrassed, and subsultus tendinum takes the place of the choreic movem termination is greatly to be apprehended.

TREATMENT.—Many different plans of treatment, and a of drugs have been proposed for the cure of the disease un tion. These facts alone may serve to teach us that the effe ment are not clearly appreciated, and also, when taken in co the circumstance that fatal cases are rare, that the disease te to recovery in a good proportion of the cases. This feature of history of the disease is shown also by the evidence given by sley, who mentions, that in the Manchester Infirmary, n ing the variety of treatment adopted by successive practitio curable case has not presented itself in the course of thirty (*Tweedie's Lib. Pract. Med.*, Am. ed., vol. ii, p. 46.)

The only rules to be laid down for its treatment are those to all the convulsive affections depending on functional diso nervous system, and on disordered states of the general health with a faulty condition of the functions of digestion and as These are attention to the general health, and especially a car tion of the diet and other hygienic conditions of the patient, a of tonics and iron, the removal of any local derangement or d may exert an unhealthy influence upon the nervous system, an ployment of such remedies as have been found to exert a effect upon spasmodic and convulsive affections generally, and disease in particular.

We shall consider, under different heads, the various means been recommended, endeavoring in the course of our remarks tinguish the cases to which each remedy is best adapted.

*Purgatives.*—This class of remedies has been extensively emp often exclusively relied upon by some very high authorities the English. When relied upon exclusively in the treatment cathartic is given every day, or every second or third day; and be no doubt that many cases have recovered under this plan. In practice we must say that the treatment by cathartics alone succeeded well, and we have only used them of late to such a was necessary to secure a soluble and healthful condition of the When, therefore, the stools are natural and healthful in all res do not think it proper to employ powerful purgatives in the trea the disease. We resort to them only when there is constipation the discharges present some unnatural appearances as to color. Under the latter circumstances we may resort to any of the active cathartics, as cream of tartar and jalap, sulphate of mag barb, aloes, &c. When the discharges from the bowels are clay or dark and offensive, when the mouth is pasty, the tongue loade thick yellowish fur, and the breath heavy, it is proper to emplo curial. Dr. Copland advises that we should commence with th tion of a full dose of calomel, either alone or with other purga by them in five or six hours. He adds that the doses of calomel ot to be frequently repeated in the disease, and thinks that it is iceable "to continue purgatives long, without either exhibiting th a bitter tonic or antispasmodic remedy, or with both, or alter- hem with those remedies."

*pasmodics* are amongst the most important remedies we have to to the disease. The weight of evidence seems to show, indeed, ey, in conjunction with a moderate use of purgatives, of tonics, lly ferruginous tonics, of certain and particular remedies, and care- ulation of the hygienic conditions of the patient, ought to consti- e treatment in the great majority of cases. Of the various reme- this class that have been employed, those which have exerted the eneficial influence are valerian, assafœtida, oxide of zinc, camphor, e root of the cimicifuga or black snake-root.

*icular remedies.*—Of the remedies belonging to this class, the one mployed in this city at present is, we think, the cimicifuga. This st introduced into use by Dr. Jesse Young, and is now extensively ed and much relied upon. Dr. Wood (*Pract. of Med.*, vol. ii, p. ays: "I have in repeated instances found it of itself adequate to re of the disease." We have employed it ourselves only in four y cases, and in two cases of relapse. In three of these, the children red entirely under its use; in one it failed to do any good, and re- took place under the use of iron, the sea-bath, and in the course e. In the two relapsed cases, the patients recovered finally under of the cimicifuga, iron, cod-liver oil, and good diet. One of the hat recovered under its use was much the worst we have ever met It was that of a boy of nine years, in whom the disease went so to destroy all power of locomotion. The child was unable even to At the same time the movements of the lips, cheeks, and tongue, o violent and irregular, and so little under the control of the will, e power of speech was lost entirely for a period of four or five The choreatic spasm appeared to affect even the muscles of de- on, so that the act of swallowing was often difficult and uncertain. ation also was impossible, and the child was unable to carry any- o his mouth, rendering it necessary to feed him, as one would a with soft solids and fluids. During some two months, the muscles ack of the neck were so weakened that the head could not be lifted e pillow or held direct, but fell from side to side or forwards like an infant. The condition of the child was altogether one of the omplete and distressing helplessness. During the first month of e, it was treated with active cathartics, chiefly very large doses of of tartar and jalap, and with iron, but as the symptoms became and worse, the cathartics were abandoned except so far as to main- y the occasional use of rhubarb and senna, a soluble state of the , which were very much disposed to constipation. The patient was ut upon the use of decoction of cimicifuga, of which he began with unces, soon increased to half a pint per day, made in the proportion an ounce to the pint. The iron was continued. Under this treat-

drachms of a saturated tincture, given three tim
part we prefer the decoction, of which we give t
nine years old, from four ounces to half a pint a
portion of half an ounce of the root to a pint of bo
in this way, it is not a disagreeable drink, and is
much objection.

Some French authors recommend chiefly valeri
assafœtida. Of these the one which has the highest
and from the evidence adduced in its favor there c
exerts a very beneficial effect upon the disease. I
form of powder, infusion, or fluid extract. The c
from twelve to eighteen grains in the day, to comn
idly increased to several drachms, as the stomach
to it. It may be given in honey or preserve-syru
the fluid extract, of which half a teaspoonful may be
or ten years old, three times a day, and the quantit
The oil of valerian is employed by some practition
given in doses of a grain every three hours to chi
and is much relied upon by some practitioners.
mended both by English and French writers. It is
account of the nauseous taste of the mixture. Two
be given to a child of four or six years of age, th
Bardsley gave it by injection, in combination with
ning, after using musk and camphor through the d

*Narcotics* have been recommended by some write
most employed are opium, belladonna, stramonium,
Substances of this class are seldom, however, made t
Opium is useful in some cases in which the agitatio
the sleep of the child is much disturbed, but it is sel
as an adjuvant to other means; and the remark a
remedies of the class.

ly for any length of time, has tried with apparently marked success ypodermic injection of Fowler's solution. He was first led to em- this in cases of chronic local chorea in adults, where the injection of of Fowler's solution, varying from five to fourteen minims, produced edy cure. He has also employed it successfully in two cases of gen- horea, the duration being twenty-eight and thirty-two days respect-

e usual manner of administration is in the form of Fowler's solution, in the ordinary doses, and immediately after eating, and steadily sted in until some evidence of its constitutional effects are produced. preparation may also be advantageously combined with the wine of

*rychnia.*—Trousseau recommends more highly than any other plan reatment, the use of sulphate of strychnia in gradually increasing s, until the extreme limit of tolerance is reached. He begins by giv- gr.$\frac{1}{28}$th twice or thrice daily, to children between five and ten years and cautiously increases this dose until it reaches about gr.$\frac{1}{4}$th in ty-four hours. The results obtained by this treatment in Trousseau's ls certainly appear good, but the risk attending it and the care de- ded to prevent accidents are so great, that we should prefer some of equally successful and less dangerous methods. It appears, how- , that other observers, as West, have obtained good results from its in doses much smaller than those recommended by Trousseau, not eding gr.$\frac{1}{24}$th thrice daily, for children of eight or ten years of age.

onium maculatum, given in the form of the succus conii, has been ly recommended by Dr. John Harley (*The Old Vegetable Neurotics*, don, 1869), in the treatment of chorea; and a certain number of s have already been reported of its successful administration. Dr. ey prescribes the succus in the doses of 20 or 30 drops for a child of months old; a drachm for one over two years old; and from one to drachms at ten years of age. In explaining the use of doses so large ese, he insists upon the fact "that hemlock given in doses which fall hort of producing its proper physiological action, is useless for the ment of the diseases to which it is adapted."

*imuli.*—The well-known views of Dr. Radcliffe upon the pathology of modic affections, have led him to recommend the free use of alcoholic ks, to the point of obtaining their decidedly sedative action on the omy, as the foundation of a rational treatment in chorea.

ithout being prepared to adopt this as a regular plan of treatment rdinary cases of the disease, we should certainly be disposed to ad- ster alcoholic stimuli whenever the symptoms indicated the approach rvous exhaustion.

*nics.*—Whenever the disease occurs in debilitated and anæmic indi- als, remedies of this class are evidently necessary, and prove of great cy. The ferruginous preparations are those most clearly indicated the circumstances; and, indeed, there are many authorities, as on, Elliotson, and others, who consider the preparations of iron suffi- of themselves, to cure almost all cases of chorea. Any of them may however. They ought not to be employed un tion, nor unless the child is willing to take the: bath terrifies or shocks the patient greatly, it ca or tepid bath used once a day, or every secon useful in promoting the general health, when tl well.

Sulphurous baths have been recommended a success, by M. Baudelocque of Paris. A rapid tained in 58 out of 65 cases. Thirty drachms o are added to each bath, which is employed for a a temperature of 91°. Generally amelioration o third bath, but sometimes not until after twelv of twenty-two days having served for the cure c cases. Where the cure is retarded, it ordinaril tient's powers being lowered by other remedies c irritation of the skin induced by the bath, or upc internal serous membranes: circumstances con while they continue. The conjunction of other than aids the case. Deducting the cases in whi erly used under the above circumstances, there r ures in eighty-one cases, these being almost a choreas. (*See* on Chorea, *Ranking's Abstract*, N

A great variety of remedies besides those we ha employed, and have more or less evidence in thei are sulphate and iodide of zinc, nitrate of silver iodine, calabar bean, and a host of others which ate. The sulphate of zinc has undoubtedly pro instances. About two grains may be given at and gradually increased to six or eight if the st well.

Counter-irritation to the spine, in all its shape lectricity has been resorted to, and apparently with good effects in e instances, and it might therefore be tried when other and simpler ns fail, or in conjunction with these means. In cases where the spas- ic movements are constant and persistent despite the use of internal edies, the inhalation of anæsthetics has been tried, but with uncertain lts.

violent cases, it is of course desirable to confine the patient to bed; it may be necessary to have padded sides made for it to prevent him n dashing himself out of bed in his uncontrollable and violent move- ts. In such cases it may even become necessary to employ padded nts, or to envelop the body with bandages carefully applied over layers adding, so as to secure the legs together, and to confine the arms by sides.

*ymnastic Exercises.*—M. Sée (*loc. cit.*, p. 481) says that this method ne of the best that has been employed. He states that it was recom- ded by Darwin, and then by Mason Good, and was first employed Louvet Lamarre in one case, after which it fell into oblivion until e of the physicians of the Children's Hospital, at Paris, and amongst rs, MM. Bouneau, Baudelocque, Guersant, and Blache, "struck, no bt, like myself, with the good effects of gymnastics in scrofula and r cachectic diseases, and taught especially by the effects of mus- tion on the general health, conceived the idea of applying this treat- t to nervous diseases, and particularly to chorea, which, besides perturbation of the nervous system, is so often attended with disor- of nutrition and of the functions of organic life. To put a stop is state of languor, to re-establish at the same time the equilibrium he movements, which are rather irregular than convulsive, to en- or, in fine, by regulating the contractions, to break up their vitiated t,—this is the triple object sought to be attained by gymnastics. Be eory or empiricism, success crowned these previsions, and proved utility of the new treatment, of which we are about to study the ods and its consequences." M. Sée says, that to commence the ment, we must prescribe first simple and cadenced movements, and ise at the same time the larynx by means of singing. "To place hild in a vertical position, make it flex and extend the knees, touch round, stretch out and bend the arms, harmonizing at the same time various movements by regulated singing,—such are the first means hich to replace the contractions under the power of the will. This ill be so much the more rapidly attained, as the attention of the nt is the less distracted, its intelligence the less changed, and its er the less capricious; so also is it often impossible to succeed unless rst obtain control over the patient by kindness and gentleness.

After reaching this point, we may attempt walking, regulated to a or quick step, running, jumping, hanging by the arms, or other more licated movements, always graduating them to the degree of the se, watching them most carefully, and repeating them daily without nging them beyond fifteen or twenty-five minutes, in order to avoid it is at least certain that it will be tedious and difficult."

In Ranking's Abstract (*loc. cit.*, p. 50) may be found th statements in regard to the treatment by gymnastic exercises

They were first employed under the guidance of M. Laisné professor of the Polytechnic School, their effects being tried fi ulous children. "Commencing with simple movements of tl arms, accompanied by appropriate songs, the children's prog rapid, that they were soon able to employ the orthopedic parallel bars, and other machinery, in succession. By the tw son they were exercised in wrestling, and afterwards in runn exercises being devised for the lame. From the first lesson t became fired with emulation, and movements which seemed were soon executed with ease and pleasure. A marked amelio speedily observed, their countenances becoming animated, thei their voices stronger, their appetite keener and more regular swellings, which had long resisted all treatment, were resolved lous sores, that had been open for years, closed up. The lesson each, were given three times a week; and in the intervals t amused themselves by repeating such of them as did not r chinery." This treatment, at first applied to scrofulous child stated above, extended to those laboring under nervous affecti paralysis, rickets, and especially chorea. Since 1847, ninety-fi suffering from chorea, sometimes so obstinate as to have resiste various treatment, have been cured by this means alone, or in c with others, and no accident has resulted from the employmen ercises. The movements are graduated according to the seve case, and they are repeated daily, but not for more than from twenty-five minutes, so as not to induce fatigue or palpitat provement is sometimes seen after the first lesson, and at late fifth or sixth; so that at the end of a week we can judge w means are likely to prove efficacious, and if ier adjunct to be employed than good diet." (Dr. Sée on Chorea, *loc.* ., No. 16, p. 50.)

HYGIENIC TREATMENT.—The management of the hygiene of the patient quite as important as any other part of the treatment. The diet should arranged to suit the particular condition of the individual, and with a ew to procure and maintain the most healthful possible state of the gestive apparatus. It should always be light and easily digestible, in der that neither the stomach nor bowels may be oppressed and deranged the products of an imperfect digestion. When the stomach is weak d dyspeptic, the food ought to consist for some days chiefly of preparaons of milk and bread, whilst in the meantime, a tonic remedy is administered internally, in order to invigorate the power of that organ. As e digestive function becomes stronger, the child ought, as a general le, to be put upon the kind of diet most likely to promote the general alth and vigor of body. It ought to consist of bread, milk, plain wholeme meats, and simple vegetables. Coffee and tea, and all other nervous imulants, had better be avoided. The meats ought to be mutton, beef, poultry. There are few vegetables, besides rice and potatoes, which e suitable under the circumstances. All candies, preserves, unripe, arse, or dried fruit, hot bread and cakes, except the very simplest, ght to be withheld.

Of dress we need merely say that it must be suited to the season. Excise, or at least, exposure to fresh air and insolation, are of the utmost onsequence. When the disease is so violent as to prevent the child from alking, it ought to be taken to drive as often as possible. In cases hich seem connected with a debilitated and anæmical condition of the onstitution, removal to the country, and particularly to the seaside, will ften effect a cure with great rapidity. Whenever, indeed, a patient inabiting a large city or town can be conveniently taken to the seaside in e summer, it ought to be done, for the change is useful not only at the me, but it lessens, also, by strengthening and invigorating the constituon for the future, the danger of a relapse.

## ARTICLE XI.

### ATROPHIC INFANTILE PARALYSIS.

Paralysis in the young child, though occasionally met with in most of he forms observed in the adult, most frequently presents itself in a form lmost peculiar to childhood, characterized by total or partial loss of power ver one or several groups of muscles, usually without impairment of senation, and often followed by atrophy of the palsied muscles, and conseuent deformities.

HISTORY AND SYNONYMES.—Occasional allusions to infantile paralysis ay be met with in medical writings even as far back as the latter part [illegible] a vague and indefinite nature [illegible] of this peculiar affection [illegible] than the writings of Kennedy and [illegible] Since the publication of Heine [illegible] observers have studied the [illegible] We have subjoined a list of the [illegible] which we have been able to [illegible]

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[illegible] Diseases of Children [illegible]
[illegible] Paris, [illegible]
[illegible] London, [illegible]
[illegible]
[illegible] 1843.
[illegible] Atrophy and Paralysis of New-born Infants [illegible] Dublin Med. Press, 1841 [illegible] Dublin [illegible]
[illegible] Nervous System [illegible] London, [illegible]
[illegible] Extremities [illegible] Stuttgart [illegible]
[illegible] Med. Times and Gaz. London [illegible]
[illegible] 1842.
[illegible]
[illegible] 1844, p. 62.
[illegible] London, 1849.
[illegible] 1844, p. [illegible]
[illegible] August, 1844.
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible] New York [illegible]
[illegible] Children. [illegible]
[illegible]
[illegible] Amer. [illegible] 1856, p. 24.
[illegible]
[illegible] Kinder [illegible]
[illegible] Amer. Med. Times [illegible]
[illegible] Infantile Paralysis. Med. Times [illegible]
[illegible] Paris, 18[illegible], p. 275.
[illegible] occurring in Young Children, induced by [illegible]
[illegible] Des Maladies du N[illegible] 4eme. Paris, [illegible]
[illegible] de l'Enfance. These de Paris [illegible]
[illegible] Paris, 1864, p. 448.
W. A. H[illegible] Infantile Paralysis. New York Med. [illegible]
[illegible] 1867, p. 48, and [illegible]
[illegible] London, [illegible]

will be observed that the vague and discordant views which have been .d in regard to its cause and nature, have led to the employment of ıny names by which to designate it. Thus it has been called by Heine antile spinal paralysis, and Meyer follows him in the use of this term; Gull it was called paralysis during dentition; by Rilliet and Barthez, ›gt, Eulenberg, Valleix, Brunniche, Laborde, and Niemeyer, essential ralysis of children; by Duchenne, who is followed by Echeverria, fatty rophic paralysis of infancy; by Reynolds, paralysis with wasting of the ıscles; by Bouchut, myogenic paralysis; by Hammond, organic infan- e paralysis; and it has also been called idiopathic and congestive in- ntile paralysis.

We have been led to select the name which heads this article, because ose above enumerated appear to us to be either vague and inaccurate, the terms essential and idiopathic; or to neglect the most striking fea- re of the disease, the muscular atrophy, as the term infantile spinal ıralysis does; or to convey a partial or even erroneous theory of the ıthology of the disease, as the names congestive and myogenic respect- ely do. The terms organic and fatty atrophic paralysis also seem to us ›fective, since the first is equally applicable to cases of palsy due to or- ınic disease of the brain, while the second is based upon the fatty de- neration of the affected muscles, which, however, occurs only in a por- ›n of the cases of infantile paralysis.

CAUSES.—The etiology of this affection is very obscure, doubtless ırtly owing to the fact that, as the paralysis occurs when the spinal stem is extremely impressible, the causes which induce it are trivial d usually entirely overlooked. Age is the only influence which can be id to have a positive action in its production, since the great majority cases occur between the ages of six months and two years, during the ›riod of primary dentition. By several of the early observers especially, e disease was on this account attributed solely to dental irritation, but ore careful observation shows that in most cases no such direct connec- ›n can be traced; and it is probable that early age and dentition only ›t indirectly by inducing a remarkably susceptible condition of the entire ›inal system.

Sex appears to have no influence whatever upon its production; and e disease is almost as frequent among the children of the wealthy as nong the illy fed and illy tended children of the poor. In some few ıses, where the loss of power is sudden, the exciting cause seems to

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C. Handfield Jones, Functional Nervous Dis. (Amer. ed.), Philada., 1867, p. 88.

J. Russell Reynolds, Lancet, vol. ii, July 11, 1868, p. 85.

C. B. Radcliffe, Art. on Infantile Paralysis, Reynolds's Syst. of Med., vol. ii, 1868, 661.

T. Hillier, Diseases of Children (Amer ed.), Phila., 1868, p. 255.

S. Wilks, Lect. on Nerv. Dis., Med. Times and Gaz., Dec. 19, 1868, p. 689.

Moritz Meyer, Electricity in Practical Medicine (translated by W. A. Hammond, .D.), New York, 1869, p. 218.

Niemeyer, Practical Medicine (Amer. ed.), New York, 1869, vol. ii, p. 338.

Vogel, Diseases of Children (Amer. ed.), New York, 1870, p. 391.

due to organic valvular disease; and it may be suggested tl tial cause of the paralysis was embolism of some of the spin: observed by Panum.[1]

MODE OF ATTACK; INITIATORY SYMPTOMS.—There is variety in the mode in which this disease makes its appearan cases the paralysis is the first symptom observed, and is f almost immediately attained its full extent, without any cause or premonitory symptom. Thus the child may have : fectly well when put to bed in the evening, and yet on the fol ing, there may be more or less complete loss of power over tremities. But in the great majority of cases, especially the ones, the attack is preceded by quite marked constitutional This may consist merely of fever, appearing without evide lasting from a few hours to a week or more, unattended b intestinal disturbance. Or, during this period, the child n plain of pain in the back, or there may be tenderness on pre ally in the lumbar region; there is frequently slight dulness or finally, in comparatively rare cases, one or more convulsion It is the rule, however, for no marked symptoms of cerebra to be present at any period of the disease. There are rare toms connected with the parts about to become paralyzed, interesting case recorded by Kennedy (*loc. cit.*), there was : muscles subsequently affected.

The disease usually makes its appearance during health, b able that many of the cases of paralysis occurring during c from the various exanthemata properly belong to this variet

Whether preceded by initiatory symptoms or not, the de the paralysis is generally sudden, and it is only in rare ca partial at first and increases gradually. Indeed it usually l when first observed the paralysis is at its maximum, both as number of muscles affected and the degree of the loss of pow iently the disease takes the form of incomplete paraplegia, though occa- onally the paralysis affects single groups of muscles or even individual uscles.

According to Mr. Adams, the groups of muscles most frequently fected are: 1. The muscles of the anterior parts of the leg forming the tensors of the toes and the flexors of the foot; 2. The extensors and ipinators of the hand, these muscles being always affected together; id 3. The extensors of the leg, and with them generally the muscles of ie foot, as in the first group. When single muscles are affected, the ost likely to suffer are these: 1. The extensor longus digitorum of the es; 2. The tibialis anticus; 3. The deltoid; and 4. The sterno-mastoid. The bladder and rectum are very rarely involved.

The degree of paralysis varies as much as its extent; usually complete t first, in some cases it soon becomes partial or even slight; while in thers the loss of power remains absolutely complete. The paralyzed iuscles are perfectly relaxed, so that the affected parts can have all their ormal movements impressed upon them without difficulty, and fall in a feless manner if left unsupported. The special senses are unimpaired; nd general sensibility is usually only blunted for a time. Occasionally is not affected at all, or, as stated by West, there may even be hyper- esthesia for a variable time.

The paralyzed muscles are rarely the seat either of painful subjective ensations or of tenderness on pressure; though in some cases severe ain may be present in the affected parts.

Reflex movements are, as a rule, abolished in those parts where there is omplete loss of voluntary motion; though Laborde (*loc. cit.*) has shown hat they may occasionally be preserved even in the first stage of the pa- alysis.

During the early stage we are at present considering, the electro-mus- ular contractility usually remains intact, and the muscles respond both o the induced and direct current.

The constitutional disturbances which we have described as preceding he paralysis, may persist for a variable time after its development or lisappear quickly, leaving no other symptoms present but those con- iected with the paralyzed parts.

The following case, seen by one of ourselves with Dr. James Tyson, nay be quoted as an illustration of this form of paralysis.

A male child, æt. thirteen months, was brought to Dr. Tyson for treat-

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n only 2 was the arm alone palsied, [illegible]
o one or both legs. In 8 cases the [illegible]
n one of the former instances [illegible]
instances, the right arm and leg [illegible]
which ptosis of the left eyelid was [illegible]
lura. Paraplegia existed [illegible]
ight arm, and in another [illegible]
lexor muscles of both thumbs [illegible]
ion was confined once to the [illegible]
f the right side; but [illegible]
he patient's gait was [illegible]

power had not become complete suddenly, but, at first partial.
ually increased. There was no tendency to coma and no eviden
acute pain. The febrile symptoms soon disappeared; the arm re
power of motion in a few days, but the leg remained palsied. It
grew remarkably cold, and when seen on October 1st, three week
attack, the temperature was decidedly lower than that of its fell
sation was impaired, but had never been abolished. There had
paralysis of either bladder or rectum. At the time of the exa
the child seemed bright and lively, though rather pale. Ther
tenderness along the spine, nor in the leg. No reflex movem
developed in the paralyzed leg by tickling the sole of the foot.
atrophy or deformity had as yet occurred.

The subsequent course of the disease varies greatly in dif
stances. In one set of cases, though the paralysis may be quite
and complete at first, the symptoms gradually subside, the para
appears, and complete recovery ensues in from four to six week
cases correspond exactly to the form of paralysis originally des
Kennedy (*loc. cit.*) under the name of "Temporary Infantile P
and, as we shall see hereafter, in all probability depend upon m
gestion of the spinal cord and meninges.

In the other set of cases, on the contrary, the loss of power
and after it has continued for a time, varying from one to several
is followed by marked and more or less rapid atrophy of the
muscles. The circulation in the paralyzed parts becomes feeble.
cutaneous veins are smaller, and Heine, and Rilliet and Bart
cite a case of paralysis of the arm in which it was almost impo
detect the radial pulse. The temperature of the affected part
perceptibly lower, the fall amounting, according to Hammond, t
to 8 or even 10 degrees, as tested by a galvanometer. The muscl

mple which they observed, to show to how remarkable a degree this
joined atrophy and arrest of development may progress. The patient
s a young girl who was seized with instantaneous paralysis of the right
er extremity; and the following measurements show the degree of
quality which was produced by four years' continuance of the paralysis
arrest of development:

| | Right leg. | Left leg. |
|---|---|---|
| From the great trochanter to the external malleolus, | 49 cent. | 54 cent. 5 mill. |
| From the patella to the malleolus, | 29 " | 32 " |
| Length of foot from heel to great toe, | 14 " 8 mill. | 18 " |

Five months previously, the following diminution in thickness of limbs
s noticed: at three fingers' breadth above the patella, on left side, 20
ntimetres, 16 on right; at the middle of the thigh, on left side, 29
ntimetres, and 22 on right. The height of the child was 116 centi-
etres.

This wasting and palsy of the muscles is associated with relaxation of
e ligaments, and the combination of these causes induces many of the
formities observed in childhood. When the paralysis affects one side
the body chiefly, it indirectly leads to various lateral curvatures in the
inal column, probably from a want of symmetrical action in the muscles
the two sides.

In cases of paralysis of the arms, the relaxation of the ligaments about
e shoulder-joint and the atrophy of the deltoid allow the head of the
merus to drop out of the glenoid cavity, so as to produce even com-
ete dislocation, with apparent elongation of the paralyzed limb to the
tent of three-fourths of an inch (West).

As the muscles of the lower extremities are far most frequently affected
this form of paralysis, we usually find the resulting deformities involv-
g the feet and legs, where they constitute the greater proportion of all
ses of club-foot. According to Adams, "these deformities occur in the
llowing order of frequency: 1. Talipes equinus; 2, equino-varus; 3,
uino-valgus; 4, calcaneus, or calcaneo-valgus; and 5, talipes varus.
hen both feet are affected, equino-varus of one foot is generally found
ith equino-valgus of the other."

In addition to the influence which the actual wasting of the limb and
e arrest of its development exert, Adams believes the great cause of such
eformities is the "adapted atrophy" of Paget, the changes which ensue
consequence of the mechanical relations of the foot to the leg. Al-
hough, however, it is true that paralysis of a group of muscles does not
xcite active contraction in their opponents, it appears that in the efforts
f the child to move the part, the non-paralyzed muscles must gain con-
rol over the limb, and aid at least in producing the various characteristic
istortions.

During the development of this atrophic stage, the general sensibility
f the affected parts is usually normal, and the general health, intelli-
gence, and nutrition of the patient unimpaired.

DURATION.—As will be inferred from our description of the course of
his affection, the entire duration and that of its different stages varies

though more frequently this change cannot be noticed
Different muscles also atrophy with very different ra
and tibialis anticus appearing to waste more rapidly t
cles of the body; and, in different cases, the same grou
equal variety in this respect, a few weeks serving in
as much wasting to occur as would require months t
cases.

PROGNOSIS.—The great uncertainty of the progres
atrophic infantile paralysis render it highly desirable
sible, the conditions which determine its result. O
fatal; but, unfortunately, our prognosis is limited, in
the disease, to this assertion, for the duration and cou
not influenced, in any constant and reliable way, eithe
patient, the extent of the paralysis or the parts affecte
symptoms. It may perhaps be stated that, in gener
ushered in by high fever, especially if associated wit
in which the paralysis is extensive, will prove severe
there are too many exceptions to every particular of t
to be regarded as a general rule of much positive valu

When paralysis has lasted three or four weeks, we
mine with much accuracy the approach of atrophy by t
electro-muscular contractility; for it has been freque
those muscles which lose their power of responding
current, soon begin to waste.

After the occurrence of atrophy, also, much valuabl
is gained from the use of electricity.

We may here mention the interesting and highly i
tion, first made in connection with this disease by H
and J. Netten Radcliffe,[1] that in many cases where the
have lost entirely their power of reacting to the most
electrical currents, they will still react vigorously to a

such contractions are not at first produced, the prognosis is not lutely unfavorable. The still more curious, and as yet inexplicable rvation has also been frequently made, that as the muscles regain power of voluntary motion, their susceptibility to the direct galvanic ent is apt to diminish, but, on the other hand, their normal reaction he induced current returns.

he prognosis will also be materially influenced, especially when the phic stage has begun, by the condition in which the tissue of the pal- muscles is found, as in cases where advanced fatty degeneration is ent, it is far more unlikely that they will ever regain their power. rder to ascertain this point, Duchenne has devised a small trochar,[1] ed by him "emporte-pièce," by which small pieces of muscle can extracted, and subsequently submitted to microscopic examination.

t is evident, finally, that the duration and result will depend, to a at extent, upon the period at which treatment is instituted. In those es where the paralysis has been allowed to continue until marked ophy has ensued, and the electro-muscular contractility is almost lost, ough the prognosis may still be favorable as regards the ultimate cure, ust be carefully guarded as to the duration, since the treatment will bably require to be steadily pursued for many weeks, or even months.

**ORBID ANATOMY AND PATHOLOGY.**—It appears desirable to introduce consideration of the anatomical appearances at this point, in order to ilitate the subsequent discussion of the pathology and diagnosis of the ease.

n regard to the changes which take place in the atrophied muscles, brief yet complete summary given by Hillier, may be quoted (*op. cit.*, e 268):

"1. The transverse striæ become less apparent and separated by wider ces, which are filled with opaque granules, which are not dissolved by er, but are sensibly acted on by acetic acid.

"2. The transverse striæ disappear, and there is an abundant appear- e of granular substance.

"3. There remain but slight traces of longitudinal fibres, filled with nules, with a larger quantity of connective tissue between the bundles.

"4. The granules have disappeared, and empty transparent tubes of olemma with a few scanty granules on their walls remain, with more nective tissue and some elastic fibres.

"5. In some cases, fat globules take the place of the granular matter the muscular fibres, and in the cellular tissue between the bundles of scular fibre. This change is not universally present in cases even en atrophy has proceeded to an extreme degree."

The last conclusion stated here, which has been confirmed by other servers, shows that perhaps the most frequent change which occurs, is imple atrophy of the muscles, with a granular but non-fatty degenera-

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[1] These trochars are manufactured by Tiemann, of New York. Dr. Hammond published (Jour. of Psych. Med., July, 1867, a description of their form and de of use, illustrated by a wood-cut.

owing to the prolonged irritation of some of the pe
it must be borne in mind that by some the form
under consideration has been regarded as a refle
on dental irritation. Apart, however, from the fa
much more closely resemble those due to spinal
seen in reflex paralysis, it is to be remembered tha
means limited to the period of dentition, and that a
irritation are frequently absent at the time of the
ralysis. With the exception then of reflex paralys
with confidence that all other forms of spinal pa
with some material lesion of this nervous trunk. I
that it is only a few years since the beautiful rese
Clarke have shown that positive structural change
and nerve-fibrils, may be detected by microscopic
cords, which present no alteration apparent to the
ing the evidence of all post-mortem examinations of
before the introduction of Clarke's method, as inco
sive, we find that in all those diseases formerly clas
(such as tetanus and chorea) which have been subject
of examination, positive demonstrable lesions have

Among this class of diseases, so long considered
neuroses, atrophic infantile paralysis has always, u
prominent position, as is evinced by the large nu
have described it under the terms "essential," or "

It is indeed difficult to secure opportunities of ex
the spinal cord in this affection, owing to the fac
scarcely ever, if at all, fatal of itself; so that the arg
to the view of its functional nature, will be in part
analogy of its symptoms to those of certain spinal
well known to be attended with positive lesions of
Thus, in its mode of appearance, and in the charac

n those cases where the paralysis disappears within a few days or ks, it has been supposed by various authors that the nature of the ase is entirely different from that of atrophic infantile paralysis; but ppears to us highly unnecessary to complicate the question by such a position, since the temporary character of the paralysis is readily ac- nted for by supposing that the spinal congestion which produced it s slight and transient.

t is quite possible also that in other cases the loss of power caused by re severe spinal congestion should persist until atrophy of the affected scles ensued, and rendered the case more protracted.

ndeed, some of the authors who most forcibly support the view of the hology of this affection which we have given above, as Dr. C. B. Rad- fe (*loc. cit.*), hold that the lesion of the cord does not advance beyond s stage of congestion. The evidence in support of this opinion is prin- ally found in the result of post-mortem examinations, as those reported Rilliet and Barthez, Fliess and Adams, where no lesions of the cord re detected. But in none of these cases does it appear that the careful d skilful microscopic examination, which is now recognized as neces- ry to detect some lesions of the nervous tissue, was performed; so that may feel at liberty to doubt the complete accuracy of these autopsies. the other hand, it certainly seems entirely consistent to suppose that certain cases, where the congestion is unusually marked and prolonged, where it is repeated, that a process of subacute inflammation should excited, resulting in the formation of inflammatory products.

The usual change which takes place in the spinal cord, under such cir- mstances, is that described under the name "sclerosis," in which there marked proliferation of the connective-tissue elements of the cord, with elling and consequent pressure upon the nerve-tubules. In the subse- ent development of the new-formed connective tissue, it undergoes ntraction, and induces atrophy of the compressed nerve-tubules. The rtions of the spinal cord where this lesion exists, may either be atro- ied or retain their normal size, shape, and external appearance, but on ansverse section, though the tissue is firm, certain parts of the white bstance are seen to present a grayish, translucent appearance, differing ticeably, in well-marked cases of the lesion, from the opaque whiteness the surrounding healthy tissue. In other instances, however, the ange in color cannot be detected, and it is only by microscopic exami- ation that we can discover the increase in the connective tissue of the ord, and the atrophy of the nerve-tubules.

This view of the nature of the lesions in atrophic infantile paralysis, as forcibly urged by Heine, in the last edition of his classical mono- raph on this subject (*op. cit.*), who based it merely upon an analysis of e symptoms, and it has since been adopted by Jaccoud (*loc. cit.*). It oes not rest, however, solely upon such reasoning, for there have been limited number of autopsies made in which the above-described lesions f sclerosis have been actually observed.

Heine quotes three post-mortem examinations in support of this theory. ne of these, quoted from Longet, was of a girl of eight years, with clubdysentery, there was atrophy of the lower part of the s

The third observation quoted by Heine, has been
from the original source (*Trans. de la Soc. Méd. de*
1862) by Jaccoud (*op. cit.*, p. 450). It was the autops
paralytic club-foot, reported by Berend and Remak, w
arachnoid was found thickened by inflammatory produ
such pressure upon the cord, that when the false men
the nervous tissue immediately protruded through the i

Berend also reported (*id. loc.*) another observation
years old, who died paraplegic with contraction of the l
autopsy was performed by Recklinghausen, who found tu

Hammond reports (*Jour. of Psych. Med.*, vol. i, p.
the paralysis affected the left leg, and had lasted fou
he found, upon post-mortem examination, a cicatrix
clot, in the lower part of the dorsal region, in the left a

Finally, in two cases of atrophic infantile paralysis rec
(*op. cit.*), the existence of sclerosis of the spinal cord w
positively, and described with great minuteness. Acco
vations, the change is especially seated in the anterio
cord, though it also involves, to a less degree, the lateral
parts are more translucent than natural, and present a
grayish-rose tint to the naked eye. The consistence of t
is diminished, and upon microscopical examination there
a marked proliferation of the elements of the connectiv
and nuclei being dispersed in the midst of a finely granu
which there are fibrils of extreme tenuity. In the part
affected the nervous tubules are either lost altogether,
varicose appearance; while the other portions of the sp
serve a perfect integrity.

We have thus quoted all the autopsies we have been
cases of atrophic infantile paralysis in which lesions o

rts in the substance of the cord, it is probably due to sclerosis of the erior columns.

DIAGNOSIS.—There is but little danger of overlooking the nature of ose cases where the paralysis appears quite suddenly in the midst of parent good health, excepting in cases occurring in young children who ve not yet learned to walk, and where the loss of power is limited to lower extremities. In such instances the paralysis may be entirely erlooked by the parents or nurse for some time. So also in cases pre- ded by constitutional disturbance, as there is nothing whatever charac- ristic in these premonitory symptoms, it is quite possible to fail to cognize the presence of paralysis. It is well, therefore, whenever a ild between six months and three years of age presents feverish symp- ms for which no apparent cause exists, to ascertain carefully whether ere is any loss of power of its extremities.

The diseases with which atrophic infantile paralysis is most likely to confounded, are other forms of paralysis of cerebral or spinal origin, nd progressive muscular atrophy.

In paralysis due to hemorrhage into the substance of the brain (see age 479), the case is more apt to be ushered in by delirium or convul- ons, followed by more or less marked coma, while in atrophic infan- le paralysis there is either entire absence of cerebral symptoms, or at ost a single convulsion occurs. Cerebral paralysis is usually hemiplegic, hile in the form of spinal paralysis we are considering, paraplegia is ore common, or the loss of power may be limited to one leg or to a ngle group of muscles. In those comparatively rare cases where the aralysis is at first hemiplegic, the arm usually soon regains its power of otion, leaving the leg paralyzed; while the reverse of this occurs in cere- ral hemiplegia, where the leg usually improves much more rapidly than he arm. In cerebral paralysis, also, the affected muscles are frequently igid instead of being relaxed; and there is not the tendency to atrophy nd deformity, the loss of electro-muscular contractility, nor the lowering f the temperature of the affected part, which are observed in atrophic nfantile paralysis.

In cases of meningeal apoplexy where the hemorrhage has occurred *upon* the surface of the brain, the symptoms are still more distinct. Thus (see page 480) there are usually repeated convulsive seizures, with som- nolence during the intervals: paralysis is rare and partial, while strabis- mus and tonic contraction of the hands and feet are very common.

In acute inflammation of the spinal cord, or myelitis, the loss of power is complete, and there is also more marked loss of sensation, and paralysis of the rectum and bladder, with alkaline urine; though there is here as well as in atrophic infantile paralysis, diminution of reflex excitability and electro-muscular contractility, and wasting of the paralyzed muscles. The symptoms first mentioned, the more grave character of the case, and the tendency of the paralysis to increase rather than decrease, suffice to distinguish myelitis from the affection under consideration.

Progressive muscular atrophy, of very rare occurrence in childen, may be distinguished by its gradually progressive course; and by the preservaited to one leg, and attended by hyperæsthesia and pain the disease may be mistaken for coxalgia, though the readily be made by attending to the slow course, the abs sis, the fixed pain in the knee-joint, and the marked incre caused by forcing the head of the femur against the acet characterize hip-disease.

Treatment.—The treatment of atrophic infantile paral vided into that adapted to the early stage and that direct second stage or period of atrophy.

In the first instance we must endeavor to discover a exciting cause of the paralysis that may exist. If sympt dentition have preceded, and the appearance of the gums i should be lanced; or if gastro-intestinal disturbance is presence of worms is suspected, laxatives should be admini baths are also recommended, as tending to allay irritati feverishness.

When, however, no local irritation can be detected to re that the case is one of reflex paralysis, we should direct o wards relieving the spinal congestion which we believe to of true atrophic infantile paralysis. Counter-irritation sho along the spine, and may be effected by producing a na preferably by the use of sinapisms or stimulating linime croton oil, ammonia, or turpentine.

Local abstraction of blood by means of cups or leeches the spine has been recommended by Fliess; and we should c its employment, especially in those cases where there i febrile disturbance and pain in the back.

There are also certain remedies from which we have obt results in the treatment of spinal congestion in the adul therefore, recommend their employment in the early stage o e begins to fall, and the muscles to atrophy, every means must be opted to promote the general nutrition of the child so as to favorably luence indirectly the changes in the spinal cord; and at the same time al treatment must be instituted to promote the circulation and nutri- n of the paralyzed parts.

Among the internal remedies, iron is one of the most suitable, and may given in any eligible form. The pyrophosphate is perhaps especially dicated on account of the phosphoric acid with which the iron is com- ned.

The various preparations of nux vomica or its alkaloid strychnia are so very valuable after the acute stage has passed. Heine advises the e of tr. nucis vomicæ in combination with camphor and pyrethrum; hile West recommends the alcoholic extract of nux vomica. Strychnia, hich is more frequently employed than the preparations of nux vomica self, is usually given in the form of solution. Hillier has also used it ypodermically, but without marked benefit.

The doses of these powerful drugs, which are recommended by some thors, especially Heine, appear to us too large to be safely administered. We should recommend beginning with a dose of at most gtt. ii of the ncture, or gr. $\frac{1}{20}$th of the alcoholic extract of nux vomica, or gr. $\frac{1}{80}$th of lphate of strychnia, for a child of two years old; the amount being in- eased steadily but cautiously so long as no unpleasant symptoms are roduced by it.

Local means must also be employed for inducing increased circulation the affected parts. For this purpose, the stimulating liniments already entioned, or moist heat, may be applied. Passive motion, and knead- g the muscles, also aid in improving their nutrition and contractile ower.

Electricity, however, certainly ranks first among the local means for estoring the contractile power of the paralyzed muscles. It is true that everal authorities have asserted that they derived no good results from ts employment, but since the introduction of localized galvanism (faralization), as developed by the researches of Duchenne, and of the use of he direct current, the most marked benefit has been obtained at all stages f this form of paralysis.

If the induced current be used, it must be carefully isolated and limited o the affected muscles, by means of wet sponges fastened to the elec- rodes. In those cases where the muscles refuse to respond to an induced urrent even of considerable power, the direct current, slowly interrupted the labile current of Remak), will be found to induce contractions, ex- epting where the muscular tissue is far advanced in fatty degeneration. n all such cases then, this direct current should be employed. We have lready alluded to the curious observation which has been made by sev- ral authors, that as the palsied muscles regain their power under the use f the direct current, they respond to it less and less strongly, while the duced current is found to again have the power of exciting muscular ontractions. When this period in the treatment of the case arrives, it probably desirable to substitute the use of the induced current.

indeed, so great "that so long as muscular contraction
recovery is merely a matter of time, but if no action
muscles can be brought about, the prognosis must be un
even here there is some hope." (Hammond, Radcliffe.)

In addition, however, to the local and general measu
mended, there is another kind of treatment scarcely less
should be employed in conjunction with them.

This consists in the use of such mechanical apparatu
exercises as shall tend to bring the affected muscles int
viate the deformities of the atrophic period. The gre
knowledge upon this subject, is due to the admirable a
servations of Heine, who has the superintendence of a
institute, and has most carefully studied the effects of t
cases of paralysis which have progressed to the stage of
formity. But it is by no means to this advanced stage
measures are adapted, for it is a matter of the highest
from a very early period of the paralysis, the little pa
subjected to this treatment.

If the legs be affected, it is not surprising that the chi
haps, gained but imperfect use of its limbs, and is makin
in walking when the paralysis appears, should feel such
curity, even when the power of motion has returned to a
tent, that it will refuse to make any renewed efforts to
parents, finding all their attempts to persuade or compel
vailing and distressing to the child, are apt to desist,
creased power of movement returns: a delay which is to
by all the steps of the atrophic period.

To supply the indispensable exercise of the muscles, a
tractive to the little patients, numerous mechanical co
been resorted to.

Vhile the legs are still almost powerless, some form of baby-jumper at same time delights the child and effectually exercises its limbs. When power of motion has returned to a somewhat greater extent, we gain same results even more completely by the use of the go-cart or veloci-le, a frame or a chair upon wheels, the motive power being furnished the alternate pressure of the rider's feet upon a pair of treadles which connected with the wheels by cranks. This imparts such a sense of urity and so much pleasure, that the child can readily be encouraged take enough exercise to preserve the play of the articulations, and to l in developing muscular power.

Dr. West makes a single objection to the use of the go-cart; that it en-urages the tendency to lean very much forward in walking, which always ists until after the little patients have learned to walk pretty well; he, erefore, advises after the child has gained some facility in the use of the -cart, that a jacket should be worn, supplied with a stout strap before d behind, so that the attendant can conveniently hold them and sup-rt the child's weight more or less completely, thus enabling it to walk ithout being thrown forward as when stepping in a go-cart.

In children of from five to seven years even, the use of crutches is soon quired, and it is desirable, so soon as possible, to abandon the other ntrivances spoken of, and trust the child to its own exertions to walk ith a pair of crutches.

When the paralysis affects the arms, precisely the same principle should uide us, and every form of persuasion, of stratagem, and contrivance, ust be used to induce the child to exercise the crippled member. Trun-ling a hoop, or raising a weight by means of a cord passing over a pulley, rnish good exercise to the arm; or we may encourage the little one to se a contrivance, also called a velocipede, in which the wheels are turned y handles, instead of treadles, attached to the cranks.

In addition to these forms of exercise, however, it is often found neces-ary to employ splints of different kinds, such as Stromeyer's, which ena-les the angle of the splint to be changed without removal from the limb, nd various modes of extension to counteract the tendency which exists o contraction of the paralyzed part. In some cases, indeed, all means re powerless to avoid this consequence, and we are obliged to resort to he section of the tendons of the contracted muscles and subsequent ex-ension, though tenotomy should not be performed until time has been llowed to show the extent of permanent paralysis, and until the conjoined se of electricity and orthopœdic apparatus has proved insufficient to re-tore the limb to its shape.

It may readily be surmised that this orthopœdic plan of treatment is ne requiring the utmost patience and persistence, and the most loving ersuasion and encouragement; for, indeed, it must be pursued, in face f all apparent failure, for months and years. Nor must we be satisfied uring this period with these efforts we are making to restore the ower of the muscles; but careful attention must be paid to the nutrition nd general health of the child, and we must continue the use of the warm

## ARTICLE XII.

### FACIAL PARALYSIS.

Paralysis of the muscles supplied with motor pow
nerve, is frequently met with as a temporary conditio
have been delivered by forceps, as a result of the pressu
the instrument upon the nerve as it emerges from th
by no means rare, however, during childhood, and eit
denly after exposure to cold, when it is possibly due t
by congestion and swelling of the tissues around the
amen; or more gradually, when it is usually due to
enlarged gland, or to disease of the petrous portion of t

The symptoms of this affection are so striking that
exist as to its diagnosis. The eye upon the affected sid
the power of knitting the forehead and of raising the
the angle of the nose and mouth on the same side hang
trickle over the cheek, and the conjunctiva frequently
or inflamed; saliva dribbles from the mouth, portions
tween the teeth and paralyzed cheek, and there is ins
spit, or distend the cheeks with air. During the acts of
ing, the face becomes distorted, owing to the immobility
side, while the antagonistic muscles act strongly and
towards the sound side.

In cases due to an affection of the nerve in its cou
petrous portion of the temporal bone, usually dependin
necrosis of this bone, there are present, besides the symp
tioned, purulent otorrhœa, deafness, diminution in tast
the tongue corresponding to the paralysis, and in som
paralysis of the velum palati.

The possibility of mistaking simple facial paralysis for
cerebral hemorrhage must be borne in mind, though atte

xpected, though the affection is often very tedious, the paralysis at s persisting for months. But when, on the other hand, it depends disease of the temporal bone, the prognosis is usually unfavorable. he treatment must also be modified according to the cause of the ck.

simple acute cases, the application of hot fomentations to the part, f one or two leeches near the stylo-mastoid foramen, should always lirected, and is often productive of good results. Later in the affec- , if the paralysis persists, small blisters should be repeatedly applied r the point of exit of the nerve.

lectricity is here also of very great service, and the same curious ervation, which was mentioned in atrophic infantile paralysis, as to the ver of the direct current to excite muscular contractions when the scles have ceased entirely to respond to an induced current, has been quently made in this affection (Baierlacher, Neumann, Radcliffe, llier).

n addition to these local remedies, the internal use of strychnia, iron, iodide of potassium, is often followed by benefit. In cases where there reason to suspect that disease of the bone, or scrofulous enlargement the cervical glands, are the cause of the paralysis, the patient should put upon the use of iodide of iron or cod-liver oil.

## ARTICLE XIII.

### PROGRESSIVE PARALYSIS, WITH APPARENT HYPERTROPHY OF THE MUSCLES.

**DEFINITION.**—This disease occurs, so far as known, exclusively in chil- en, and is characterized by progressive loss of power, advancing until arly all the muscles of the body may be involved, while at the same ne the affected muscles appear to increase in size from hypertrophy of eir interfibrillar fatty and connective tissue.

**HISTORY AND SYNONYMES.**—True progressive muscular atrophy is ex- mely rare in children; and among the cases which have been described, by Meryon,[1] a certain number seem to belong to the curious disease w under consideration. The distinctive features of this latter affection re first recognized by Duchenne,[2] who has been studying it for more than years past. Cases have also been recorded by several authors, as by lenberg and Cohnheim,[3] Griesinger and Billroth,[4] Heller,[5] Seidel, Nie-

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Pract. and Path. Researches on Paralysis, London, 1864, p. 200, et seq.

De l'Electrisation Localisée, 2ème ed., Paris, 1861; and also a communication pre- ted in Duchenne's name by J. Lockhart Clarke to London Path. Soc.: see Trans- ions, vol. xix, 1868, p. 6, with photographic illustrations.

Verhandlungen der Berliner Medicinischen Gesellschaft, Hft. 2, 1866, p. 200.

Verhandl. der Berlin. Med. Gesellsch., vol. i, 1866, p. 101–205.

Deutsche Arch. f. Klin. Med., vol. i, 616–627.

has also been called "lipomatosis luxurians muscu
lipomatous muscular atrophy (Seidel); progressive m
a result of hypertrophy of the interstitial fatty tissu

Causes.—The causes of this affection are entirely
tainly exerts a powerful influence upon its producti
has as yet only been observed in childhood, and h
some cases to be congenital (Niemeyer).

Sex appears also to exercise a positive influence,
cases have occurred in boys. The curious fact has
that several children in the same family are apt to b
indicating some hereditary tendency. Apart from
ences, however, there is nothing known as to the c
paralysis.

Symptoms.—The disease either begins in early i
manifested at the time the child should begin to wal
pearance some years after the power of walking has

The disease usually affects the muscles of the leg
wards; in Niemeyer's case, on the other hand, it
muscles, and subsequently affected all the muscles o
ties. The early symptoms are, therefore, connecte
it is observed either that the child does not begin to
and then walks imperfectly, or that having walked w
he begins to be readily tired by standing or walkin
peculiarities in his gait. When the disease is fully
before it has advanced far, the mode of walking an
characteristic. The patients find that, without some
tions become more and more difficult and painful, a
ject to frequent falls. In order to maintain thei
standing or walking, the lower dorsal and lumbar spin
while the upper part of the spine, the shoulders and
wards, the legs are widely separated, and in walk

d the pelvis; if this position were changed, he doubled forwards at
ip-joint." (*Loc. cit.*)

hile this impairment of progression is developing, the affected mus-
ndergo remarkable changes. These are thus described by Duchenne:
second stage is usually announced some months, and even two years,
the beginning of the muscular weakness, by a progressive swelling
nlargement of the gastrocnemii, then of the glutei, and of the lumbar
les of the spine. This apparent hypertrophy occurs sometimes in
ly all the muscles which have been affected by paralysis, but in gen-
it does not, and it may even be limited to a very small number of
. . . . The hypertrophied muscles are firm and elastic; they become
hard while they contract, and show all the relief or projection
h properly belongs to their contracted state; they then appear to
a hernial protrusion through the integument, which is very thin;
eover, their great size shows off the apparent smallness and delicacy
e joints at the knee, ankle, &c." (*Loc. cit.*)

e skin over the affected muscles may have a red, marbled appear-
; the temperature of the part is lowered, and the power of voluntary
raction is greatly impaired, while the electro-muscular contractility
either remain intact or be impaired.

hen this pseudo-hypertrophy is marked, and affects many muscles, it
s a most curious appearance to the children. Niemeyer speaks of
atient as looking "as if he had the body and head of a weak child
he hips and thighs of a strong man;" and J. Lockhart Clarke, in de-
bing one of Duchenne's patients, says: "He looked like a little Her-
s. Every visible muscle of the body, except the pectorals, was enor-
sly developed; his head, even, appeared swollen, and the temporal
cles stood out like convex shells. Yet, when the poor boy attempted
alk, he labored to get along, presenting the most grotesque appear-
e; and when laid on the ground, he was wholly unable to rise by his
unaided efforts." (*Loc. cit.*, p. 9.)

he disease may remain at this stage for several years, or even until a
rably advanced period of youth, but finally it is succeeded by a stage
hich the loss of power becomes more complete and extensive, involv-
the upper extremities and muscles of respiration, and confining the
ents to the recumbent position. The sphincters and other involun-
muscles are not affected. During this final stage there is a rapid
rease in the size of the hypertrophied muscles, and the limbs may
n come to present an appearance of great atrophy.

here are no peculiar disturbances of the general health; the appetite
digestion remain good, and the mind clear until the close of the case.
Mr. Adams's case, however, the mental condition was peculiar, the boy
g dull, heavy, indolent, and apathetic, with mischievous and dirty
its. Death usually occurs before adult age from some intercurrent
ction of the respiratory organs.

URATION.—As will be inferred from the foregoing description, the
ation of cases of this disease varies from five to fifteen years, or more.

ROGNOSIS.—The course of this form of paralysis is steadily progressive, and, despite the various plans of treatment ad formly led to a fatal result.

Diagnosis.—The only disease with which the affection eration could be confounded is progressive muscular atro with this, error would be possible only during the early the disease, before the appearance of the hypertrophy parts, or after this had disappeared.

Progressive muscular atrophy is, however, very rare in is characterized by the occurrence of atrophy preceding and by fibrillar contractions and quiverings in the affect while the peculiar symptoms present in progressive paraly rent hypertrophy, are wanting.

Morbid Anatomy.—The condition of the affected musc studied, both during life, small fragments being removed by trochar (emporte-pièce), and after death.

Their color is altered, and the muscles present either a or yellowish appearance, or are marked with stripes of yellow white; on section they shine with a dull, greasy lustre.

Upon microscopic examination, the true muscular substan atrophied, the fibrils being pale and small, and in some pla sheaths of sarcolemma are seen. According to Cohnheim fibrils are occasionally reduced to one-fifth their normal diame from this atrophy, however, the fibrils are healthy, and pres fatty nor granular change. In this respect the cases recorded differ from the others which have been examined, since he granular degeneration of the muscular fibres, with rupture of lemma (*op. cit.*).

The most marked change is, however, in the condition of stitial tissue. This presents great hypertrophy of the conne with abundant formation of wavy fibrous tissue and of fat. It ble that, owing to this hypertrophy of the interstitial fatty tissue, the muscular fibres are subjected to so much pressure as simple atrophy.

No lesions whatever have been detected in the central nervous in any of the few cases yet examined.

Treatment.—So far as is yet known, no remedies appear to power to control the course of this strange affection. It is Benedikt (see Niemeyer, *loc. cit.*), that good results have been in three cases by the use of the direct current, the copper placed over the lower cervical ganglion, and the zinc pole along of the lumbar vertebræ, by means of a broad metal plate. Niemey however, tried this mode of treatment for a long time without any

Long-continued faradization and shampooing have also been produce no benefit.

# CLASS V.

## CONSTITUTIONAL DISEASES.

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## ARTICLE I.

### ACUTE RHEUMATISM.

s it is not designed to enter into a full discussion of the numerous tions which merely occur in childhood in common with the other ods of life, we shall present but a brief account of rheumatism in chil- , alluding particularly to those points in which it differs from the e disease in adults.

e interest attaching to rheumatism among the diseases of childhood been of late much increased by the connection which has been estab- d between it and chorea. This question has been treated of under head of the latter affection, and we will limit ourselves at this place ne discussion of acute articular rheumatism.

YMPTOMS.—Acute rheumatism expresses itself in the child, as in the dt, by painful inflammation of one or more of the larger joints, usually mpanied by a high grade of febrile action. It is probable, however, in the majority of cases in children, the fever is not so intense nor course of the disease so long, as in adults.

he fever, which is one of the most marked symptoms, may precede development of inflammation of the joints by one or two days, or y coincide with the appearance of pain and swelling. It is generally ked in severe cases, and attended by frequency of the pulse, great t of the skin, and, usually, copious acid perspirations. The heat of the n and frequency of the pulse constitute a good index of the severity of disease, and we may always apprehend a dangerous attack when the perature rises above 104° or 105°.

With this febrile action, we find disturbances of the digestive functions; tongue is heavily coated, the appetite lost, or nausea may be present, d the bowels are sluggish, the evacuations being dark and offensive.

The local phenomena attending this fever depend upon acute inflam- tion of some of the large joints.

Occasionally the ankles, knee-joints, wrists, elbows, and shoulder-joints ll be simultaneously affected; but in far the majority of cases, a few y of these articulations will be involved, and the others become affected sequently, if indeed they do not escape entirely. But one of the most racteristic features of this specific rheumatic inflammation, though most marked in the chronic form, is its tendency to shift its [illegible] may find the intense pain and heat of one part transferred [illegible] four hours to a distant joint. We can rarely learn from the [illegible] the character of the pain which causes such bitter compl[illegible] mild case, recorded by Rilliet and Barthez, it was compared [illegible] light blows given upon the affected joints.

The *heat* of the inflamed part is always much increased, [illegible] unusual to find its temperature ranging from 100° to 105° [illegible]

The *swelling* is generally considerable, so that the shape [illegible] may be much changed. When the knee-joint is inflamed, [illegible] may raise the patella from its position on the condyles.

The skin over the inflamed joints usually presents a more [illegible] cided blush.

We must not, however, overlook the fact that the severity [illegible] articular troubles is not always commensurate with the rheuma[illegible] and that frequently, especially in very young children, the [illegible] may be slight or even absent, and the only feature which teach[illegible] the real nature of the disorder may be soreness, evinced by cr[illegible] attempt to move the patient.

DURATION.—The duration of acute rheumatism varies [illegible] According to Rilliet and Barthez, it follows a much more rap[illegible] children than in adults, occasionally yielding at the end of six [illegible] nearly always before the fifteenth day. We have, however, [illegible] rheumatic fever last twenty-one days, and before convalescence [illegible] entered upon, six weeks had elapsed.

There is a marked tendency to relapses and second attacks [illegible] matism, at whatever age it occurs; and we frequently meet with [illegible] of twelve or fifteen years of age who have passed through [illegible] acute attacks of this disease.

CAUSES.—*Age.*—Early infancy appears to protect, to a certain [illegible] against this affection. Rilliet and Barthez allude to a case [illegible] the age of seven months; but the earliest age at which they [illegible] was at four years in a single case.

We have ourselves observed one case in the second year, [illegible] others between the close of the second and fifth years.

The influence which *sex* exercises upon the frequency of [illegible] in childhood seems still undetermined. It is usually stated that [illegible] far more liable to the disease than girls, but in our own experi[illegible] been more frequent in girls; and from the register of the Child[illegible] pital in London (quoted by Tuckwell, *St. Barth. Hosp. Rep.*, [illegible] p. 102), it appears that of 478 cases of rheumatism treated during [illegible] years, 252 were in females, and only 226 in males.

*Cold and Dampness.*—Of external causes, the most pro[illegible] doubtedly are, sudden vicissitudes of temperature, especially [illegible] with dampness of the atmosphere, whereas the mere degree of [illegible] exercises but little influence upon its development. Of course the [illegible] of damp and cold is markedly increased by insufficient clothing.

*Complications.*—We have already alluded to the occurrence [illegible] cerebral symptoms in connection with rheumatism (see article on a), and the most important and frequent of all these complications, arious inflammations of the membranes of the heart, have been ed of under the head of diseases of that organ.

OGNOSIS.—Uncomplicated rheumatism in childhood, though at times e, is scarcely ever fatal. When complicated, however, with endo- or arditis, the gravity of the prognosis must depend upon the extent severity of the inflammation. For although, even when the heart is usly involved, the child frequently survives the acute symptoms, it ften bears with it the seeds of premature death, in an organic disease at organ.

AGNOSIS.—The diagnosis of acute rheumatism, after the appearance e articular symptoms, can hardly present difficulty. When, however, ed rheumatic fever, accompanied merely by vague pains, precedes veral days the development of any local symptoms, the diagnosis remain uncertain, or we may be led to regard as rheumatism one of cases of phlegmon of the deep tissues of the extremities, such as is ed to in the introductory essay of this work. In addition to this, ust be careful to distinguish the articular affections occurring in ia, or those supervening upon attacks of small-pox and scarlet fever, are probably also of pyæmic nature. The diagnosis in these cases be chiefly established by attention to the general symptoms and the nt's history; to the occurrence of repeated chills or irregular febrile ysms, the diarrhœa, the greater degree of prostration and more emaciation, and the more frequent fatality. The joints involved in latter affections present large collections of creamy pus, and the lar cartilages are discolored, or eroded and destroyed in patches. ally, Rilliet and Barthez cite a case (from *Jour. Hebdomadaire*, t. ii, ) of hemorrhage under the periosteum of the clavicles, which simu- rheumatic inflammation of the sterno-clavicular joints, but which be distinguished by ordinary attention to the general symptoms, in f the occurrence of such a rare condition.

m our own experience we should think that, during the early stage umatic fever, the affections with which it might be most readily con- ed, are pleurisy and pneumonia, and typhoid fever.

absence of the physical signs of the two former affections, and of arrhœa and delirium of the latter, should we think lead the physi- o suspect the rheumatic nature of the attack. And if in addition should be any fixed pain about the limbs, or unusual soreness and n being moved, or if any sign of cardiac inflammation be detected, uspicion would be confirmed. Thus in a case seen by one of us, at first the height of the fever and the great thirst led us to suspect xistence of pneumonia or pleurisy—of which, however, no physical could be detected—the occurrence, on the third day, of complaints n in the right groin, led to a more careful examination of the heart, the presence of a soft, faint mitral murmur, declared the nature of tack.

ATMENT.—The indications for treatment presented by acute rheu-

the second indication, the mitigation of pain, opium must
proportion to the severity of the suffering. It is best given
oses at short intervals, and by administering it in combina-
pecacuanha, as in the form of Dover's powder, we derive the
nefit of a sedative and diaphoretic action. We have already
formula by which we usually direct it in this disease. The in-
d painful joints should be bathed with a sedative liniment, as
chloroform, and laudanum, and enveloped in bats of wool, and
red with oiled silk, so accurately applied as to exclude entirely
nal air.

ition to the other remedies, attention must be paid to the con-
the bowels, and if constipation exists, as is very frequent, mild
atives or laxative enemata should be administered as frequently
ed. Anything like purgation, however, should be avoided, on
f the excruciating suffering often produced by the movements
to have a stool. We desire, however, to call attention to the
young children with this disease may persist in lying in one
ition for even several days, dreading to be touched; so that
dded to the inevitable pain of the disease, the distress occasioned
ng-continued contact of single points of the opposing articulat-
ces. Under these circumstances it is wise, and greatly promotes
rt of the patient, to gently change the angle of the limbs by ar-
illows so as to support them and alter their direction.

ard to the last indication—the prevention of complications—
important means is the avoidance of all exposure of the patient
or to changes of temperature. In the fulfilment of this, the
care must be paid to the temperature of the sick-room, to the
of the patient, and to the mode of conducting all our examina-
r. Chambers, in his admirable lectures upon this subject (*Clini-*
*res*, American edition, pp. 156, 177, &c.), dwells with special
n this point, and enjoins the exclusive use of blankets and flan-
he bedding and clothing of patients with rheumatism, and gives
ing summary of his observations of the effects of this precaution
he treatment of nearly two hundred cases of rheumatism: "That
in blankets reduces from sixteen to four, or by three-fourths,
f inflammation of the heart, diminishes the intensity of the in-
n when it does occur, and diminishes still further the danger of
that or any other lesion."

portance of confinement to bed in this disease is difficult to
ate; the inflamed condition of the joints absolutely demands it,
endency to cardiac inflammation warns us to save the heart all
ry exertion, which strict attention, as above recommended, to
le warmth of the surface, effects better than any other means.

he diet in this affection, we must be guided by the acuteness of
toms and the condition of the patient. If the fever be marked,
hild vigorous, a diet chiefly consisting of milk and water is best
the early part of the attack, but so soon as the febrile stage has
, or when the patient is of feeble constitution, we may give soft-

the urgency of the symptoms and the vigor of constitution j the removal of the cups or leeches, warm mush-poultices plied steadily over the whole præcordial region.

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## ARTICLE II.

### DIPHTHERIA.

**Definition: Synonymes: History: Frequency.**—Dip acute febrile, moderately contagious, and infectious asthe order, occurring also endemically and epidemically; with istic eruption, and distinguished by a disposition to the for membranes upon inflamed mucous surfaces, especially in upon abrasions of the cutaneous surface.

It is the disease called by the older writers, angina mali nosa; cynanche maligna; garotillo; angina suffocativa, und it was described by Dr. Samuel Bard, of New York, in one the early essays upon this subject (*Trans. Amer. Philos.*

It is, indeed, thought probable, that the history of this a traced back to a period beyond the time of Hippocrates; b ably the writings of Aretæus, who flourished in the second Christian era, contain a distinct description of this maligna He describes it under the names of ulcus Syriacum and tiacum.

From this period, there is quite frequent mention of the works of medical writers; the earliest account of its appear times being given by Hecker, who describes an epidemic vailed in Holland, in 1337.

About the middle of the last century, it prevailed in Pari described by MM. Malouin and Chomel;

h the treatise of Bretonneau in 1826, in which he gave the first pre- notion of the disease, and bestowed the name diphtherite upon it.

ince then it has occurred frequently epidemically in France; in 1857 peared almost simultaneously in England, and in the extreme western of our own country, and from that time has occurred in the form of lemics of greater or less extent and severity, in the most varied cli- es and seasons, in almost all known parts of the globe.

iphtheria, the name by which this epidemic pseudo-membranous ina is commonly designated, is a synonyme of the word diphtherite, ginally used by Bretonneau in his treatise on this subject.

ιφθερα and Διφθερυς both mean "the prepared skin of an animal;" and θεριτης and Διφθεριας signify alike, "that which is covered with a skin membrane."

o cases of death from diphtheria in Philadelphia are reported in the ual lists of mortality published by the Board of Health, until the year 0. In the preceding report, however, Dr. Jewell mentions that several ere cases had occurred, some of which had proved fatal. One of us , however, assert from his personal experience, that well-marked cases diphtheria were of not rare occurrence in this city for a number of years ore that time, but were reported under other names, and usually as er croup or angina.

t is probable, however, that the disease did not prevail at all exten- ly previously to its great outbreak in 1860, as may be seen by a refer- e to the number of deaths from croup and scarlatina, returned for the rs preceding and subsequent to that date.

TOTAL NUMBER OF DEATHS FROM

| | Scarlatina. | Croup. | Diphtheria. |
|---|---|---|---|
| 1855, | 163 | 265 | |
| 1856, | 992 | 268 | |
| 1857, | 704 | 256 | |
| 1858, | 241 | 292 | |
| 1859, | 232 | 312 | |
| 1860, | 206 | 354 | 307 |
| 1861, | 329 | 304 | 502 |
| 1862, | 461 | 258 | 325 |
| 1863, | 275 | 444 | 434 |
| 1864, | 349 | 455 | 357 |

he total number of deaths from scarlatina, from 1855 to 1859 inclu- e, were 2332; from 1860 to 1864 inclusive, 1620, or 712 less than in the vious period.

he total number of deaths from croup from 1855 to 1859 inclusive, re 1393; from 1860 to 1864 inclusive, 1815, or 422 more than in the vious 5 years. And, further, during the latter 5 years, 1860 to 1864, deaths from diphtheria amount to 1925.

AUSES.—In regard to the epidemic and occasionally endemic nature diphtheria, the evidence is unanimously favorable, but it is still, to a tain extent, an open question as to how far it possesses contagious infectious properties.

Bretonneau[6] also maintains strongly the infectious nature
and holds that it is transmitted directly by contact with th
duct generated by the local disorder, *i. e.*, the pseudo-memb
must be admitted that the cases now on record, in which th
been so transmitted, are too clear and well authenticated
doubt.

Apart from these well-ascertained properties, nothing is
with regard to the general conditions which favor its produ
appears to have prevailed with equal severity in healthy a
situations; in damp marshy districts and in dry hilly re
crowded filthy houses of great cities, and in sparsely popul
in the depth of winter and in the intense heat of summer.

Nor can it yet be positively asserted (although it is prob
regard to diphtheria, as in the case of other zymotic diseas
dren of feeble constitution and those subjected to bad hy
tions, or debilitated by severe illness, are particularly exp
pecially in the sporadic form.

The effect of local causes, of a depressing character, upo
tion of diphtheria was investigated by Dr. Ballard,[7] in rega
cases. Inquiries at the houses where the 57 deaths had occ
that in 24 instances the houses were damp, and that defe
some similar cause gave rise to offensive smells; in 4 house
were overcrowded, and the ventilation deficient; in 8 cases,
water was foul, or there was some noxious accumulation; a
nothing whatever could be discovered amiss in the hygieni
the houses.

It is certain, however, that occasionally diphtheria appe
radic form, and isolated cases occur which can be attributed
cause whatever.

We subjoin a table of the mortality from croup and dipt
community during the past seven years; upon which we h

| MONTH. | 1862. |  | 1863. |  | 1864. |  | 1865. |  | 1866. |  | 1867. |  | 1868. |  | Mean of these Seven Years. |  | Mean Temperature for Seven Years. | Mean Fall of Rain during Seven Years. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. | Croup. | Diphtheria. |  |  |
| January, | 44 | 30 | 36 | 34 | 59 | 27 | 44 | 33 | 43 | 24 | 22 | 17 | 34 | 12 | 40.3 | 25.3 | 30.87° | 3.828 |
| February, | 24 | 40 | 27 | 42 | 39 | 26 | 50 | 30 | 31 | 19 | 13 | 9 | 8 | 7 | 27.4 | 24.7 | 33.89° | 4.103 |
| March, . | 29 | 26 | 26 | 24 | 62 | 43 | 44 | 28 | 30 | 21 | 20 | 17 | 18 | 6 | 32.7 | 23.6 | 40.85° | 4.328 |
| April, . | 15 | 22 | 34 | 31 | 36 | 15 | 23 | 22 | 13 | 8 | 21 | 10 | 16 | 12 | 22.6 | 17.1 | 52.27° | 3.97 |
| May, . . | 17 | 22 | 11 | 17 | 41 | 27 | 18 | 12 | 27 | 19 | 12 | 9 | 11 | 10 | 19.6 | 16.8 | 62.77° | 5.959 |
| June, . . | 7 | 12 | 17 | 18 | 19 | 21 | 12 | 20 | 11 | 12 | 6 | 6 | 10 | 2 | 11.7 | 13 | 71.97° | 5.239 |
| July, . . | 8 | 24 | 20 | 33 | 11 | 22 | 15 | 10 | 4 | 12 | 8 | 7 | 4 | 6 | 10 | 16.3 | 77.71° | 3.875 |
| August, . | 7 | 24 | 12 | 35 | 19 | 30 | 15 | 14 | 12 | 15 | 3 | 8 | 8 | 4 | 10.8 | 18.6 | 76.62° | 4.105 |
| Sept., . . | 16 | 24 | 55 | 68 | 34 | 34 | 21 | 12 | 4 | 13 | 4 | 5 | 10 | 7 | 20.6 | 23.3 | 68.81° | 5.616 |
| October, . | 18 | 40 | 49 | 36 | 33 | 47 | 33 | 25 | 22 | 16 | 25 | 11 | 26 | 18 | 29.4 | 27.6 | 56.8° | 3.19 |
| Nov., . . | 36 | 32 | 69 | 34 | 51 | 31 | 43 | 29 | 24 | 18 | 16 | 8 | 29 | 12 | 38.3 | 23.4 | 46.68° | 3.62 |
| December, | 37 | 29 | 87 | 62 | 51 | 34 | 32 | 25 | 18 | 15 | 35 | 11 | 32 | 22 | 41.7 | 28.3 | 34.7° | 3 822 |
| Total, | 258 | 325 | 443 | 434 | 455 | 357 | 350 | 260 | 239 | 192 | 185 | 118 | 206 | 118 |  |  |  |  |

shows in the clearest and most marked manner the direc season upon its frequency.

Thus croup is far most frequent during the three months December, and January, and, with the exception of Febru less and less frequent as you leave these months in eitl until during July, the hottest month of our year, it falls than one-fourth of its maximum frequency. During the diphtheria, whose maximum mortality is one-third less than (both maxima occurring in December), causes more than more deaths than croup does, the proportion being 16.3 to

*Sex* appears to have absolutely no influence upon the diphtheria, since of 1804 fatal cases occurring in this city d seven years, 901 were males, and 903 females.

*Age*, on the other hand, unquestionably exerts a very s posing influence, a large majority of all recorded cases occu the ages of one and eight years.

Of the 1804 cases in our table, 190 occurred under the ag 335 between one and two years; 725 between two and five y between five and ten years. Although the liability thus an uncertain ratio, with advancing years, no age is exempt reference to the influence of age upon the frequency of true p it will be seen that the maximum of its frequency is also att the ages of one and five years. We would also call attentio greater frequency with which diphtheria occurs in later lif since of 2136 deaths from croup, but 77 were over ten years of 1804 deaths from diphtheria, not less than 199 occur period.

Nature.—In his earliest writings upon this subject, B tached little importance to the constitutional symptoms at theria, and upheld the view that it was essentially a local though he subsequently somewhat modified his views, he ve

lood disease, attended with marked constitutional disturbance, which
usually of a decidedly asthenic character.

This view is at present almost universally adopted; and in accordance
th it, we find diphtheria removed from the place which it formerly held
systematic treatises, among the local affections of the pharynx, and
scussed as one of the general diseases.

The chief arguments in favor of its being a constitutional disease, are
epidemic and contagious nature; the continued febrile action, of as-
enic type, which attends its course; the marked alteration of the blood
ass in color and consistence; the tendency to pseudo-membranous exu-
tion on mucous membranes, or abrasions of the skin; the occurrence of
buminuria; and, finally, the frequent development of paralytic sequelæ,
owing the presence of some morbid agent, acting especially upon the
rvous system.

Bouchut,[1] to a certain extent, agrees with Bretonneau. He divides
phtheria into false, or non-infecting, which is mere pseudo-membranous
gina; and the true, or infecting, which involves the entire system, by
eans of the absorption of septic substances from the pharynx. In this
spect it resembles pyæmia, and produces swelling of the lymphatics, al-
ration of the blood, albuminuria, and even metastatic deposits.

PATHOLOGICAL ANATOMY.—*False Membranes.*—We have already dwelt
pon the fact, that the pseudo-membranous exudation can no longer be
garded as the essential and most important element in diphtheria; it is,
owever, one of the most constant and striking phenomena, and in cer-
in cases, where it extends into the larynx, becomes the effective cause
f death.

It has been most carefully studied in regard to its mode of develop-
ent and extension, seat, and microscopic characters, by Empis, Breton-
eau, Wade,[2] Thompson, Darrach,[3] Trousseau, Sanderson.[4]

*Mode of Development.*—When fully developed, the pseudo-membranous
eposit has the ordinary appearances of a fibro-plastic membrane; but
his stage is preceded, according to the researches of Empis and others,
y the exudation of a sero-mucous, transparent, and viscid fluid; which
aries in abundance in different cases, at times even forming, as noticed
y Trousseau and Empis, in the neighborhood of parts lately covered by
eposit, a sort of submucous exudation, sufficient to raise the epithelium
n the form of phlyctenæ.

This sero-mucous liquid does not long remain transparent and diffluent,
ut soon becomes a little less transparent in points, gains a yellowish
tint, acquires greater density, and adheres more strongly to the subjacent
mucous membrane. These points, at first isolated and circumscribed,
soon coalesce so as to form a delicate pellicle, but slightly cohering, and
capable of being raised from the mucous membrane by slight traction;

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[1] Mal. des Enfants, 4ème ed., pp. 907–923.

[2] London Lancet, February 5, 1859 (*et ante*).

[3] Trans. Coll. of Phys. of Phila., February 6, 1861 (Amer. Jour. Med. Sci.).

[4] Brit. and For. Med.-Chir. Rev., Jan., 1860.

its connections, slight hemorrhage will follow, or numerou
points may be seen upon the subjacent mucous membran

According to Empis, the appearance of the opaque sp
sero-mucous fluid is due to a precipitation of fibrin indep
agency of living tissue. Thus the tubular casts which
passages are rarely adherent, and are usually much sı
cavity occupied; and in cases of tracheotomy he has not
to become lined within a few hours with a layer of whitish
thickness of which continually increased, and which was
the result of coagulation of the liquid by which the side
were constantly covered.

*Color.*—The color of the pseudo-membrane varies at d
and somewhat according to its seat.

In the fauces, the deposit is often whitish at first, but
yellow tint; though in some cases it is quite gray, and pı
pearance of extensive sloughs on the fauces and pharynx.
there is usually a bloody sanious fluid effused which imbı
membrane, discolors it, and promotes its decomposition,
dark-colored shreddy patches, exhaling a fetid, gangreno

It is essential to bear in mind that these appearances c
diphtheria are usually due to decomposition of the false m
and that, if this be removed, the mucous membrane will ge
merely raw, excoriated, and oozing blood.

It is, however, true that in certain epidemics the rul
serious lesions of the mucous membrane, involving even
ness, to occur.

In milder cases, where the disappearance of the false
be studied, it is never seen to separate all at once, leavin
cicatrized surface, but the pellicle gradually diminishes in
extent. When the pseudo-membrane extends into the la
apt to remain whitish throughout its course there than in

*Microscopic Anatomy*.—There were formerly different views enter- ned with regard to the minute anatomy of the pseudo-membranous osits in diphtheria.

Vogel originally associated with the disease the presence of the oidium icans, the parasite which we have seen to be characteristic of muguet; d, more recently, Laycock, of Edinburgh, has insisted upon the occur- ce of this cryptogam in the pseudo-membranes of diphtheria.

Dr. Wade, of Birmingham, has noticed also in some cases, in or near e exudation, the spores of the leptothrix buccalis, a fungus very com- nly met with in the secretions of the mouth and pharynx.

Further investigations have shown, however, that these parasites are casionally present in numerous diseased conditions of the mouth and uces, and that their occurrence in diphtheria is to be considered as a ere accident, and not as an essential part of the affection.

The microscopic appearances which are constant, are the ordinary ements of corpuscular lymph: exudation cells or even pus corpuscles, anule cells and free fatty granules, and more or less abundant and osely interlacing fibrillæ, mixed with epithelial cells of various shapes d sizes. In the majority of specimens, the corpuscular elements greatly edominate, the fibres being few and small; and indeed it is only in the mer, more tenacious, pseudo-membranes that much true fibrillation is ticed.

*Chemical Characters*.—The false membranes contract and shrivel when eated with alcohol; mineral acids, such as sulphuric, muriatic, nitric, chromic; strong solutions of nitrate of silver; or solutions of the per- lts of iron.

On the other hand, they soften more or less quickly when treated with kaline solutions, as of potassa, soda, lime, or ammonia; or of chlorate potash, chlorate of soda, bromide of potassium; or with glycerine and rious other agents. Recently, pepsin has also been announced as a werful solvent. These various chemical properties are constantly rned to account in the treatment of diphtheria, in guiding our selection the most appropriate local applications.

*Condition of subjacent Mucous Membrane*.—Even before the appear- nce of the slightest exudation, the mucous membrane of the fauces is ten seen to be red and somewhat swollen. After the pseudo-membrane fully developed, it is of course impossible, without forcibly detaching it, gain any idea of the condition of the mucous membrane beneath, and nquestionably very many of the descriptions given of extensive gan- renous ulceration of the fauces and pharynx, have referred merely to he changes in the pseudo-membrane due to its decomposition and the mbibition of sanious fluid.

In the vast majority of cases, the subjacent mucous membrane is not ruly ulcerated, but is merely much congested and swollen, with an ex- oriated and roughened appearance from removal of its epithelium, and ccasionally presents spots of ecchymosis.

At times it is whitish, opaque, or unnaturally pale; while in other cases t is purplish or otherwise discolored. When the deposit is raised up,

This accident occurs much more frequently in some
others, as may be readily seen by a comparison of the a
different authors of the anatomical lesions noticed in th
have respectively studied.

The submucous tissue is often œdematous, infiltrated
rum, or is the seat of an interstitial exudation of lymph.
the œsophagus and the muscular tissue around the fauc
are congested and infiltrated.

When croup ensues, the mucous membrane of the lar
is more or less swollen and congested, and, according t
distinct erosion of its surface, with small ulcers about
glottis, in a larger proportion of cases than ulceration is
fauces. M. Isambert[1] suggested that this condition mi
tinguish diphtheritic from idiopathic croup; but West h
cisely similar ulceration of the mucous membrane of the
of primary croup, and is disposed to regard its presen
mainly dependent on the rate of progress of the disease
termination.[2]

SEAT OF THE EXUDATION.—The pseudo-membranous d
first seen upon the tonsils and soft palate, and in some c
these parts throughout the whole course of the case.

Frequently, however, the exudation spreads and co
more or less extensively, or extends into the posterior
wards through the larynx into the trachea and bronchi
into the œsophagus.

It is rare for any exudation to occur on the mucous
the cheeks, or upon the gums, though according to s
Hutchinson[3] and Bouchut, ulcerative stomatitis is in real
theria. The epiglottis is at times covered with a pseu
deposit, so as to become swollen, rigid, and almost immov
partially obstructing, without being able to protect the e

s and extends thence in so insidious a manner as readily to escape ction.

e will discuss more fully the questions relating to the extension of exudation into the larynx under the head of diphtheritic croup.

he diphtheritic pseudo-membrane is not, however, limited to these ous surfaces, but is occasionally seen, and especially in very severe es, to form upon the mucous membrane of the vulva or of the anus.

t is, moreover, a most significant fact in regard to this affection, that portion of the external cutaneous surface which has been denuded of dermis, may become the seat of this deposit, and that in some cases pseudo-membranous formation is even limited to the skin, constitut- the so-called external or cutaneous diphtheria. So far, however, from attending constitutional symptoms being less severe in the external n in the ordinary form, the tendency to deposit upon the cutaneous face usually presents itself in cases of a typhoid adynamic type.

It appears, indeed, that this pseudo-membrane may occur at any point the body to which the atmospheric air has access; but it has never en noticed on parts which are removed from its influence.

Notwithstanding these apparently distinctive features of the diphther- c deposit, it is impossible by mere ocular or microscopic examination distinguish it from the pseudo-membranous deposit in cases of ordi- ry scarlatinous angina.

It is more, therefore, in the peculiar constitutional disturbance that must look for the specific nature of diphtheria than in the presence and aracters of the false membranes.

*The Submaxillary Glands* are almost always enlarged, though they rely acquire the enormous size and peculiar brawny induration so often ticed in scarlatina. It is, moreover, very rare for this condition to rminate in suppuration of the gland.

The *Heart* has been found, by Hillier,[1] in a state of fatty degeneration two cases, and by Bristowe (*id. loc.*) in one; all of which were rather ronic. In some instances where symptoms of endocarditis were present ring life, the auriculo-ventricular valves have been found in an incipi- t stage of inflammation. (Bridger.[2])

Heart-clots of large size and firm consistence, evidently of ante-mortem rmation, are also found in a certain number of cases where death has en preceded by peculiar signs of circulatory embarrassment.

The *Lungs* are not rarely found inflamed and consolidated to a greater less extent. In other cases the exudation is found penetrating deeply to their structure, filling the smaller bronchial tubes, and the lung itself in parts collapsed or carnified.

Bouchut speaks of having seen small apoplectiform patches, similar to ose which precede the so-called metastatic abscesses in pyæmia.

The *Kidneys* are at times quite healthy; in other cases, however, they ve been found congested, and the renal epithelium granular and de-color, rough, and very much thickened and softened. T large and soft, uneven, and often infiltrated with pus. I mucous membrane is far more frequently and seriously ul form than in the primary. False membranes are almost generally on different portions of the fauces, and more ra whole extent. They are generally rather soft and thin, grayish, or yellow color, dispersed in fragments and easily

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[1] Diseases of Children, Am. ed., 1868, p. 154.

[2] Med. Times and Gaz., Jan., 1864, p. 201; and Brit. Med. Jour., Oct. 22, 1864.

The inflamed parts are usually bathed in a purulent fl maxillary glands are large, red, and soft; and, in addition found various lesions of other organs, due to the primary course of which the diphtheritic angina has been develope

SYMPTOMS.—Diphtheria presents itself either as a primar affection. The symptoms of this latter form are, howev with the symptoms of the diseases in the course of which i that it seems desirable to consider it in connection with th

The symptoms of primary diphtheria demand much mo the present day than was accorded to them a few years ag

So long as the disease appeared but rarely, and in a sp seems to have been attended with few grave symptoms, sa sion of the pseudo-membrane to the larynx gave rise to cro the prevalence of diphtheria in epidemic and endemic form the disease appears to have changed, and though cases st but trifling constitutional disturbance, there are others, an merous, which present all the gravest symptoms of blood-p

In a strictly systematic discussion it might be well to div into a mild form, which would include most sporadic cases the epidemic ones, and a severe form, under which head w prised all cases distinguished by a high degree of constitu ance. For practical purposes, however, it is sufficient to g tion of the ordinary course of the disease, dwelling upon most important symptoms, and alluding to the chief pecul found before the second day. The fauces generally present slight ling and redness prior to the appearance of the false membrane, h almost always shows itself first on one of the tonsils, only, in the of whitish or opaline spots, like coagulated mucus, which soon run ther and extend over the whole gland, and then to the soft palate pharynx, though it sometimes remains limited to the tonsils and soft te. A little later in the attack the plastic deposit exists in the form ayers of greater or less extent; it has lost its transparency, become er in consistence, thicker, and changes from a white to a yellowish-te or lardaceous, and sometimes grayish color.

he breath in this case is offensive, but not fetid; and there is but le salivation.

Vhen in favorable cases, this disease is left to pursue its natural course, pseudo-membrane becomes thinner, assumes a grayish tint, and falls about the sixth or seventh day. When, on the contrary, topical reme- s are applied to the throat, the membrane is often detached after one, o, or three days, but may be reproduced several times before the con- sion of the case.

In some unfavorable cases, on the contrary, even though the exudation y disappear more or less completely from the pharynx, it extends down- rds into the larynx, and we have true croup developed, which, but too en, proves fatal in spite of all remedies.

In more violent cases, the pseudo-membrane, about the time that it be- ns to be detached, assumes a grayish or blackish color, and hangs in reds from the surfaces to which it was attached. The fauces, under ese circumstances, present a gangrenous aspect, the mucous membrane ving an appearance as though it were falling off in sloughs; the breath extremely fetid, and there is more or less abundant salivation, or in me cases an expuition of sanguinolent fluid.

There can be no doubt that it was from misconception of such cases as ese, that the titles of gangrenous and putrid sore throat arose.

As the exudation disappears from the pharynx, the swelling of the rts affected gradually subsides. The mucous membrane, from which e plastic matter has just fallen, is more or less injected and red; the nsils and soft palate are sometimes found to be reduced below their tural size.

Even when the throat affection is very severe there is not often so uch difficulty in opening the jaws nor in deglutition as is met with in arlatina.

The *submaxillary glands* are almost always enlarged and slightly inful to the touch, about three or four days after the appearance of the eudo-membrane. The enlargement is usually greatest on the side where e inflammation of the fauces is most intense. The surrounding cellular ssue shares in the inflammation, so that the swelling is often very great, d impedes the movements of the jaw; it is rarely, however, save in ry bad cases, so hard and painful as the corresponding swelling in arlatina.

*Pain and Difficulty in Deglutition.*—There is quite frequently no com-ous aspect, and typhoid symptoms are present, the pain in swallowing, if they have existed, are apt to disappear.

Varieties Depending upon Extension of the E *Croupal Variety.*—It would be a matter of much interest in what proportion of cases this complication may be a whether there be any definite and constant relation betwe or character of the exudation in the pharynx and its ex larynx. As yet, however, no general conclusions can be regard to any of these points. The frequency of its occ much in different epidemics, the proportion varying from cent. to as high as fifty per cent. of all the cases.

As might be expected from the considerations presen head of croup, this complication occurs more frequently and fatal in children than in adults.

It is a well-recognized fact that true diphtheritic croup i preceded or accompanied by pseudo-membranous exudatio or pharynx, but the amount of deposit in these latter plac tremely small and yet be followed by extensive exudation sages; while, on the other hand, there is often copious de pharynx in cases where the larynx does not become invad

No case, indeed, is free from the chance of this complica tutes the chief source of danger in the mild variety, and yet met with as the immediate cause of death in the most mal

The pseudo-membrane is quite frequently found, in case passages have become involved, to extend through the lary as far down as the tertiary bronchi, or in some instances finest divisions.

In this respect diphtheritic croup does not differ from unless it be, indeed, that it seems to be more frequent in th exudation to extend to the smaller bronchial tubes.

We have seen that there is no essential difference in t in the larynx are much the same as in primary diphtheritic croup. nucous membrane here, however, as in the fauces, is usually more sely inflamed, and is more frequently ulcerated.

e possibility of the occurrence of croup should never be lost sight ıd every case should be treated as though it tended to invade the x. It is especially important to detect the very earliest signs of the oaching danger, since its onset is frequently extremely insidious.

violent cough is excited by attempts to swallow liquids, it usually ates that the epiglottis is inflamed, and the seat of pseudo-membran- xudation, which impedes its movements and thus allows the fluid to into the larynx. The extension of the exudation to the larynx is ated by the cough acquiring a rough croupy sound, though it often not the loud clangor of ordinary croup; the respiration becoming ant, and the voice weak and hoarse.

hen the false membrane in the larynx is fully developed, the voice is ost or quite extinct, and the cough, losing its croupy character, be- es stifled and less frequent. The respiration is now peculiar; there onstantly a certain degree of dyspnœa, as shown by the frequent ored breathing, but there are, in addition, paroxysms of suffocation, aced by spasm of the laryngeal muscles, during which the dyspnœa ightful, and attended with tossing of the whole body and the most ent efforts at inspiration.

eath may occur during one of these paroxysms; but usually they sub- and are followed by intervals of comparative ease, soon interrupted he recurrence of the same alarming phenomena.

he intervals become more and more brief, and finally the patient sinks a comatose condition, and dies with all the symptoms of asphyxia.

uring the violent efforts at respiration which attend these paroxysms lyspnœa, or owing to the action of remedies, portions of the exuda- a are dislodged and coughed up, the most urgent symptoms are often nediately relieved. It is, however, but a deceitful repose, for in most es the pseudo-membrane reforms, and the recurrence of the croupy ce and sibilant respiration announce that the danger of suffocation is in imminent.

n favorable cases, however, either when the membrane does not re- m, or when it is dislodged as often as formed, recovery may occur; paroxysms of dyspnœa recur at lengthening intervals, and finally dis- ear; the cough becomes gradually more soft, and fragments of pseudo- mbrane, mixed with muco-purulent fluid, are discharged; the voice re- ns, and the capillary circulation becomes re-established.

n some cases, when the exudation has extended through the larynx l trachea deeply into the minute bronchial tubes, there is an absence marked croupal symptoms, and death occurs slowly, after extreme spnœa and oppression of the chest, with all the symptoms of deficient ation of the blood. These cases occur more frequently in adults than children on account of the larger size of the larynx in the former.

The reader is referred for a more full account of this condition to the icle on pseudo-membranous laryngitis.

2. *Nasal Variety.*—We have already mentioned that Bret that the disease occasionally begins at the nares, and ext a most insidious manner. More frequently, however, the aff nares is consequent upon a extension of the exudation from th

This complication is second in gravity only to the occurre It impedes still further the already obstructed respiration, with a foul acrid discharge from the nostrils, and, in addition, has shown that it is usually a sign of great malignancy in the cording to Trousseau, the result is almost always fatal, the blo ing being marked, as shown by the great alteration in the pro erties of the blood, the proneness to hemorrhages, the waxy skin, and the ultimate fatal termination by syncope.

The detection of this complication in its incipient stage is the highest importance, and Bretonneau (5th memoir, *Syd. Soc.* 196, 197) has laid down the most minute directions for its re at this stage. If the patient present any evidence of dise passages, as a slight snuffling or coryza, during the prevalen theria, the finger should be placed behind the angle of the below the lobe of the ear, and thence passed down the side of and if swelling of the cervical glands be noticed, it renders that there is false membrane in the nares.

If, further, the upper lip be found reddened exclusively nostril, and that on the side of the glandular swelling, or if the exists on both sides, but unequally, and if the lip is corres reddened, the probability that there is nasal diphtheria is conv a certainty, since ordinary coryza, acting equally on both duces equal redness of both sides of the upper lip.

3. *Cutaneous Diphtheria.*—It is one of the characters of which entitles it to be regarded as a blood disease, that differe tant parts are apt to become affected simultaneously or consecu the peculiar inflammation and exudation. We find, indeed, that cases of diphtheria there is a tendency to the formation of ps brane upon any portion of skin denuded of its epidermis.

This tendency varies greatly in different epidemics; accordi experience it is of rare occurrence in this city. It was, howeve by Bard nearly a century ago, and has been made the subject of study by Bretonneau and Trousseau.[1] The pseudo-membrane any blistered surface; upon leech-bites; upon excoriations; in behind the ears, or at the angles of the mouth; or on the out vagina and rectum.

The part that is to be the seat of pseudo-membranous deposit surrounded by an erysipelatous redness; it is painful, exudes dant fetid serous fluid, and soon becomes covered with a gray membrane. This deposit gains in thickness from beneath; and same time extends in every direction, by the development of in the neighborhood, the bases of which become the seat of dip deposit.

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[1] On Cutaneous Diphtheria, Arch. Gén. de Méd., 1830 (et loc. ante

e layers of membrane, bathed in the fetid serous fluid, soon change , decompose, become horribly offensive, and impart the appearance ie gangrene.

ousseau has observed this cutaneous exudation in cases where no ion of the throat existed, and has clearly established the identity of various forms of diphtheria by facts collected in an epidemic in the iborhood of Orleans, where the disease in some persons presented its iary features, while in others the exudation occurred on the vulva, on ered surfaces, on the hairy scalp affected with favus, or upon ulcers.

ie constitutional symptoms which accompany cutaneous diphtheria isually extremely grave and adynamic.

ENERAL SYMPTOMS.—In the mild form of this disease, the invasion ften highly insidious; there is usually fever, but the strength and etite are not much disturbed at first. There is at the same time, in e, but not all cases, pain in the throat, which may or may not be acpanied by difficulty of deglutition. Both these symptoms are, howr, often very slight, or they may be entirely wanting, a fact with which practitioner should be well acquainted, as this absence of local sympis by which to explain the cause of the sickness, gives to the disease, ome instances, a remarkably insidious character which may well misl. In one fatal case, at three years of age, that came under our notice, re were neither complaints of pain, nor difficulty of swallowing, so t the parents had not the least suspicion of the throat being the ; of disease, though we found it violently inflamed, and covered with osits of thick false membrane in points. On another occasion, we e sent for to see two children who had been sick for four days with ht fever, languor, and loss of appetite, but who were not thought to seriously ill. We found them laboring under extensive pseudo-memnous angina, with the early symptoms of croup. They both died a days later of croup. The symptoms, prior to the development of the up, had been so mild in both cases as to cause no alarm, and yet the inose disease had evidently been progressing insidiously for several s. We attended a few years since, for three days in succession, a who was attacked suddenly with vomiting and slight fever, loss of etite and languor, and whom we supposed to be suffering from mere tric irritation. His only local symptom was pain in the chin, and this not reported to us until afterwards. The mother chanced to look his throat, and, finding there some whitish spots, sent us word. We nd him with very considerable membranous exudation, which was forately prevented from extending into the larynx by proper treatment. te frequently have we been sent for to see children attacked with up, and on finding the fauces thickly covered with exudation, have been l that the patient has been ailing for near a week before with languor, ht peevishness, loss of appetite, and some little pain in the throat. To point, the strangely insidious character of the anginose symptoms in early stage of many cases, we cannot too strongly invite the attention he reader. It is one of the very greatest importance, since at that e, above all others, ought the case to be placed under proper treatment.

Such cases are rarely fatal, and, as a rule, yield readi
treatment for diphtheria.

These mild cases, in which the only danger is fron
the exudation into the larynx, are, however, far from
theria as it is now known to us; and there are numero
the gravity depends not upon an accidental extension
but upon the essential alteration of the blood, and th
entire system.

In these cases also the onset may be insidious, tl
preceded for a short time by general malaise, indispo
the part of children, and to exertion on that of adults,
ing of the cervical glands, and pain on deglutition.

Whether these prodromes have been present or no
marked chill ushers in the febrile action, which is often
a few days; so that, when the throat affection is decid
exist for a short time, whether the approaching attack i
or diphtheria. The fever, however, soon subsides al
sometimes indeed leaving the surface pale and cooler tl
pulse may remain frequent, but is weak and compressi
eral symptoms are all characteristic of deficient vital fo

There is not usually any marked mental disturbance
day, the child being intelligent, though dull and indisp
tion to anything.

There are but few symptoms of digestive disorder; tl
is often retained for the first day or two, soon diminisl
often becomes unwilling to take any food, partly from
by the efforts to swallow, partly from complete anorexi
any vomiting, unless provoked by remedies; and th
usually torpid, occasionally incline to be loose. Th
scanty, quite frequently albuminous, and upon micros
is found to contain renal epithelium, and

e voice is commonly obscured and nasal, or somewhat hoarse, even the larynx is not involved.

ough sometimes exists, and may have a slightly ringing spasmodic acter, due to mere irritation of the larynx, though it usually resembles ound that produced by the action of hawking, rather than a common gh.

a very small proportion of the cases, an eruption, resembling that carlatina, appears at irregular periods in the course of the disease. It ears, however, that this eruption lacks the punctated appearance of scarlatinous rash; does not appear at any fixed day of the disease; is gular in its progress, and is not followed by desquamation.

he reports of it are, however, scarcely numerous or accurate enough nable us to say positively that intermingled cases of scarlatina have been mistaken for diphtheria, or that the two poisons may not have n acting jointly.

he further course of these cases varies widely. If the result is to be avorable, the depression and loss of strength increase rapidly; the sur e grows pale or sallow, and is below the natural temperature; the pulse omes exceedingly frequent and feeble; the fauces assume a gangre- is appearance from decomposition of the false membranes; the swelling he cervical glands increases, and the patient often refuses to make the rt to swallow, though deglutition is still generally possible; there is a stant fetid discharge from the mouth and nostrils; the breath is horri- offensive; and death ensues amid the most profound prostration. Or, a much earlier period of the disease, the fatal event may be precipi- ed by the extension of the exudation to the larynx.

If, on the other hand, the case tends towards recovery, the false mem- nes become detached and thrown off, the strength improves, the pulse omes fuller and stronger, and the appetite returns. Even in advanced ivalescence, however, there is serious danger, as will be seen more ly hereafter, of the occurrence of troublesome or even fatal sequelæ.

In a still more severe group of cases than those above sketched, the nptoms are of the most asthenic or malignant type.

In these cases the anginose affection, though it may be severe, rarely racts much attention. The pseudo-membranes in the fauces are soft l pulpy, and, when examined microscopically, highly corpuscular and nular; they soon decompose, and become discolored by the blood ich exudes from the mucous membrane. There is, moreover, a strong position for the exudation to extend to the posterior nares, or to appear various portions of the external cutaneous surface. The breath and discharge from the mouth and nostrils are indescribably fetid. In ne cases true ulceration, and even gangrene, of the fauces occurs. ere is, however, less pain complained of, and less indisposition to allow than in many lighter cases, owing probably to the depression of nervous centres from the poisoned state of the blood. There may be h fever during the first few days, but this soon disappears, and is re- ced by a deadly pallor of surface; extremely feeble, running pulse; l at times low muttering delirium.

It is impossible, however, to say that the disease l
course in this time, since there are sequelæ which ma
vanced convalescence, and retard the recovery even
On the other hand, in fatal cases, death may occur
as the end of the second day; though usually the lary
implicated under five or six days, and this accident
the twelfth or fourteenth day of the attack.

In extremely malignant cases, death may also occ
few days. On the whole, however, it may be said tl
deaths from all causes occur in the period between tl
days. When death results from one of the sequelæ,
kidneys or paralysis, it may be deferred for weeks, or e

PROGNOSIS.—In cases of ordinary severity, when
early, and the disease remains limited to the pharyn
ally favorable; though no case, not even the mildest,
either of extension into the larynx or bronchial tube
of the supervention of some complication, such as
formation of heart clots. If, on the contrary, the exud
nasal passages, the prognosis is more unfavorable; a
becomes implicated, the prognosis is exceedingly grav
to the production of false membrane spread to the ski
the prognosis is also very grave, and death generally
profound adynamia.

If any other signs of unusual malignancy are prese
slowness, or great frequency and smallness of pulse;
with pallor and coolness of the surface; great tumefa
glands; abundant pseudo-membranes, pultaceous and
ing; hemorrhages from various mucous surfaces; ac
from the mouth or nostrils; intense and persisting
diminution of the amount of urea excreted; the prog
much more unfavorable.

the result; but extreme youth undoubtedly renders the prognosis
ı more grave.

e prognosis in the secondary form of diphtheria is also more unfa- le than in the primary.

AGNOSIS.—We have already sufficiently dwelt upon the general symp- and local signs which enable us to detect diphtheria, in every in- ce, after the disease has fully developed itself.

examining the fauces in the early stage of the affection, it is well to ember that in simple angina, the crypts of the tonsil glands occasion- become so distended by their secretion as to present the appearance nall, round, and slightly elevated whitish patches, which might readily ose upon a hasty observer for pseudo-membranous deposits.

ı regard to the value of the peculiarities upon which a differential gnosis between diphtheritic croup and idiopathic primary membranous ıp is so frequently based, we have fully expressed our opinion in the cle on the latter disease, to which we would refer the reader.

*iagnosis from Scarlatina.*—The great resemblance which at times its between the anginose symptoms of scarlatina and diphtheria has some authors to suggest that they are identical diseases, and the fol- ing further points of resemblance have been adduced: the two affec- ıs prevail frequently simultaneously in the same region, and even in same family; in certain cases of diphtheria, a rash, very similar to of scarlatina, is said to appear; and the urine, in diphtheria, is fre- ntly albuminous. That this similarity is, however, more apparent ı real, is evident from the following considerations.

Although in some epidemics of diphtheria a rash is said to have ı occasionally noticed, its occurrence is at most the rare exception, ead of the almost invariable rule, as in scarlatina; it differs, too, from of scarlatina, in appearing at irregular periods, in being partial, ap- ring suddenly in patches, not deepening gradually in intensity, and eing of a uniform erythematous redness, without the punctated ap- rance peculiar to the scarlatinous eruption.

. The albuminuria of diphtheria presents these distinctive features as pared with that of scarlatina, that there is not always any diminution he amount, nor any constant change in the character of the urine n it is present; that it occurs in the early part of the attack, and in- ıses as the disease approaches its height, or may disappear suddenly, n in the early part of its course; that although usually noticed in se- cases (and probably a very unfavorable symptom), there seems to ıo necessary connection between the urine becoming non-albuminous the disease assuming a milder type.

. There is a wide difference in the sequelæ which succeed the two ctions; dropsy scarcely ever following diphtheria, while various par- ic phenomena, which are rarely noticed after scarlatina, are of frequent ırrence. It is very much more common, also, to have suppuration of glands of the neck after scarlatina.

ı the same way endocarditis, though it has recently been noticed in w cases of diphtheria, is much more frequent in scarlatina.

formation upon this subject, scarlatina and diphtheria m as entirely distinct affections, although presenting quite n of singular resemblance.

COMPLICATIONS AND SEQUELÆ.—*Albuminuria.*—We hav alluded to the peculiarities of the albuminuria of diphthe portance of the symptom merits a more full discussion.

The occasional presence of albumen in the urine in case was first noticed by Mr. Wade in 1857, who also found the albumen, tube-casts and renal epithelium. It was sh recognized by MM. Bouchut and Empis[1] in thirteen out and since then has been found, in a varying proportion many observers in different epidemics.

The character of the urine when it contains albumen i but usually it is quite pellucid, of acid reaction, and appa any deposit; although, on standing, both tube-casts and settle to the bottom. The quantity also varies considerab ing found it much diminished, while, according to Wes frequently remains normal.

The amount of urea excreted is usually increased in d according to Sanderson, the presence of albumen and tu urine is not necessarily associated with any interference in but this does not agree with the examinations of others, w diminution of the solid excreta when albumen was present

The quantity of albumen varies much, being at times a again being present in large amount. The kinds of tub by Wade, and which are the ones usually found, were sma casts of a similar size, but granular, probably from comm gration, and ordinary epithelial casts, and fibrinous flakes.

Albuminuria in diphtheria occurs at various stages of th some cases even during the first few days. It not rarely c es that the quantity of albumen is usually in direct proportion to the ention of effete material, and that indications of impairment of the al function are almost constantly precursors of an unfavorable termi- ion.

illier (*op. cit.*) examined 38 very severe cases in regard to this point, d found albumen present in 33, 32 of which proved fatal, while of the ree from albuminuria, all recovered.

The albumen appeared in 1 case on the fourth day, in 3 on the fifth y, in 2 on the seventh day, in 5 on the ninth, and in 1 each on the rteenth and nineteenth days. Usually the albumen disappears from the ne as the severity of the symptoms diminishes, but Bouchut has known o persist after convalescence, and finally produce, as in Bright's dis- se, anasarca and hydrothorax.

*Heart-clot.*—The formation of coagula in the cavities of the heart during e has been noticed in many conditions of the system; and this terrible, cause almost necessarily fatal accident, is now always dreaded in the urse of several diseases, of which diphtheria is eminently one.

There have even been epidemics of an unknown nature, but where the ly discoverable lesion have been enormous fibrinous concretions in the art. Such epidemics have been recorded by Huxham, Chisholm, and ently by Armand.[1]

The symptoms mentioned by these authors as significant of this acci- nt are, pain at the pit of the stomach; difficulty in respiration; extreme xiety and restlessness; anxious expression and depression of spirits; ght, dry, and rather spasmodic cough; the face being at times livid, and e surface dry and inclining to be cool, with coldness of the extremities. e pulse was small and irregular, and, in some of Armand's cases, an ab- rmal murmur was detected in the heart; there was usually consider- le dulness over the cardiac region; the respiratory murmur remained re and quite full, and the chest normally resonant.

In diphtheria, Dr. Richardson[2] appears to have been the first to call tention to the difference between these symptoms of embarrassed circu- tion and those of obstructed respiration, as met with in diphtheritic oup.

His account of the symptoms of the former condition agrees closely ith that given above as to the coolness and almost marbly pallor of the rface; the moderate lividity of the face; the constant restlessness and tense anxiety; the feeble, quick, and irregular action of the heart, with muffled character of the sounds, and in some cases an abnormal mur- ur. He also calls attention to a peculiar prominence of the anterior part the thorax in very young children, which he believes to be strictly agnostic of fibrinous obstruction.

In obstruction of respiration, on the other hand, the surface becomes id, the veins turgid, and the muscles are often convulsed; the heart-

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[1] Des Concretions Fibrineuses et Polypiformes du Cœur, 1857.

[2] Med. Times and Gaz., March 8, 1856; British Med. Jour., Feb. 16 and April 1860.

after a few days battling against the constantly increas
the little patients each died as though worn out by the n

In no case was there any evidence of any other organ b
one of the cases was, however, complicated with albumin

The pulse was not noted to be over one hundred; the
were unattended with murmur, but confused, indistinct,
though reduplicated.

There was no marked paralysis, but in one case partia
in another marked muscular debility.

At the autopsy, in each case, the right side of the l
clots, which were either dark-colored, with whitish spot
white throughout, quite firm, and adherent to the endoc
peared to have been forming for several days. In one ca
left ventricle presented at its lower extremity a broken, ir
and frayed or granulated appearance, as though the disi
cess by which thrombi are broken up, had commenced in
the cases were there any evidences of endocarditis. The
has been observed during the past ten years by Dr. Barry,[3]
and Mr. C. R. Thompson.[4]

Most of the cases have occurred in young subjects, a
formed late in the course of the disease, or even after co
begun. The cause of this deposition of fibrin is not ver
our article on this subject, already referred to, it was sugg
coagulation might depend upon some peculiar change in t
endocardium, analogous to that which gives rise to the d
udation on mucous surfaces.

No such alteration has, however, as yet been detected, an
son, to whom the profession is so much indebted for his
upon the coagulation of the blood, attributes it, in this
ficiency of the volatile agent which retains the fibrin in sol
with an actual increase in the amount of the fibrin of t

in the course of the disease, and has been attended with pain in the
ordia, frequent pulse, hurried respiration, an anxious countenance,
in some cases a systolic murmur. In fatal cases, there was found a
hened, reddened, thickened appearance of the valves, as if due to
stitial deposit.

*aralysis.*—One of the most frequent and important, and certainly
most peculiar of the sequelæ of diphtheria, is the occurrence of pa-
sis. It originally attracted the attention of MM. Trousseau, La-
e, and Faure, under the form of difficulty of deglutition and a nasal
acter of the voice; but since then has been observed in the most
ed forms and degrees, affecting both general and special sensation
the power of motion. In most cases, every trace of the primary dis-
has disappeared before any paralysis is noticed; the patient sleeps,
, and digests well, yet many cases emaciate, and there is often marked
r of the surface. In many instances also, especially in children,
e is great irascibility or irritability of temper.

ost frequently a nasal character of voice and regurgitation of liquids
ugh the nose are the first symptoms to call attention to the disease,
gh these may be preceded by some slight difficulty in articulation, or
teration of the sense of taste at the back of the tongue. On examin-
he fauces the soft palate is found hanging relaxed, and, if it be pricked,
is no contraction of it, nor does it give the patient pain.

times but one side is paralyzed, and the uvula is drawn towards
ound side. The affection may extend no further than the fauces, and
disappear; or it may advance, the eye usually becoming next affected,
wing the throat affection, and preceding any paralysis of the limbs.
impairment of vision is rarely of long duration, lasting from a few
to two months, and is of every grade from mere inability to read fine
to perfect blindness.

Greenhow has noticed that the pupils become dilated, and act
ishly under the influence of light, for a day or two before the sight
nes sensibly impaired, and may remain so for a time after sight has
regained. He has also observed that patients who were unable to
with unassisted sight could do so with the aid of convex glasses, so
he attributes the impairment of sight to paralysis of the ciliary
le and temporary loss of the adjusting power.

addition to this want of accommodation, however, depending on
sis of the ciliary muscle, Bouchut believes that there is in many
, and especially in those who have had albuminuria, a serous infiltra-
f the fundus of the eye, due to the anæmic condition of the blood,
which may impair the nutrition of the optic nerve, and even lead to
ophy.

afness may follow this amaurosis; then the lower limbs become af-
, the patient becoming paraplegic, and next the upper extremities;
he muscles of the alimentary canal and bladder, causing impaction
rectum with fæces and retention of urine, or the sphincters of
organs alone may be involved, and lead to involuntary discharges.
y, the muscles of the trunk, including those of respiration, may be-

paralysis, whether it be of motion or sensation, i
gradual, even in the same set of muscles, and usually i
before it extends to other parts. The mind, though oft
acts correctly in most cases.

During the continuance of these phenomena, the ap
good and digestion easy; but there are often marked
continuance of some morbid agent in the economy.
an earthy, sallow hue, calorification is often imperfect.
tion is much depressed, the pulse being small, weak, a
in frequency.

In some cases, indeed, the affection runs on to a f
consequent upon a failure of one of the vital functions
respiration. M. Faure has given a vivid picture of thes
worst form, when the patient, paralyzed, indescribabl
imperfect speech and power of deglutition, impaired vis
mind, œdema, and even gangrene of the extremities, fin
fainting fit, or passes away almost imperceptibly.

The result of diphtheritic paralysis is, however, fav
majority of cases; thus of 77 cases collected by Dr. Rey
fatal. The duration is, however, more uncertain, vary
two weeks to several months, the mean duration being a

It is as yet impossible to advance any satisfactory ex
cause of these grave paralytic sequelæ. They occur
fourth of all cases, in greater or less degree, and are
least equal frequency after mild as after severe attacks.

At first, indeed, the faucial paralysis was attributed to
cause as inflammation of the sheath of the nerves suppl
and Greenhow still contends that the nerve affections b
tion to the local severity of the attack, the paralysis and
more complete on that side of the fauces which has bee
affected by the primary disease; but we have been abl

*taxic Form.*—In some cases, which are comparatively rare, the nerve
ction does not constitute actual paralysis, but takes the form of loco-
or ataxia. In such cases, the muscular force in the affected parts,
ally the lower extremities, is not materially diminished, so that the pa-
nt can move them forcibly when he is lying down; but there is such a
ree of incoordination in the motions communicated to them, that
mbined movements, even in the supine position, may become impossi-
. It is, however, especially in walking, that this loss of co-ordinating
ver manifests itself, the gait becomes irregular, the patient falls if the
s are closed, and the case presents all the characteristics peculiar to
l-marked locomotor ataxia.

The first instance of this diphtheritic ataxia appears to have been ob-
ved by Jaccoud[1] in 1861; it was soon after noticed by Eisenmann;[2]
d more recently a well-marked case has been reported by Dr. Gray,[3] in
oy of nine years old, following an apparently mild case of diphtheria.
is evident, also, as pointed out by Jaccoud, that a certain number of
cases which have been reported under the name of diphtheritic paraly-
, have in reality been examples of locomotor ataxia, the paralysis having
n only apparent. This diphtheritic ataxia is in all probability due to
same unknown morbid condition or dyscrasia, which causes the ac-
l paralytic symptoms which are more frequently observed as sequelæ
diphtheria. It usually yields to the treatment recommended for the
ter conditions, though in Gray's case, death occurred, apparently from
id loss of nervous power, seven weeks after the appearance of the ner-
s symptoms.

**Treatment.**—The treatment may be usefully considered under the two
ds of local and general. Of late years, the importance of the latter has
n more and more recognized as supreme, and, indeed, the utility of all
al treatment has been questioned on the ground that the throat affec-
n is merely a local evidence of the constitutional disease, and that the
ease rarely kills save by involving organs beyond the influence of such
ents. Still, on the other hand, there are eminent authorities, as Trous-
au, who assert that topical applications are the most successful and
portant remedies in diphtheria.

The great objects to be held in view in the local treatment, are to favor
e separation of the pseudo-membranes, and to prevent their extension
m the fauces into the larynx and nasal passages.

**Local Treatment.**—The most important of the local remedies are in-
ded in the lists of astringents and caustics.

Of these, nitrate of silver has probably been used more than any other
bstance for many years past, and is highly recommended by MM. Bre-
nneau, Valleix, Grisolle, Rilliet and Barthez, Trousseau, West, and
any others.

It is employed both in solution and substance. The latter form is,

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[1] Les Paraplégies et l'Ataxie du Mouvement, p. 631, Paris, 1864.

[2] Die Bewegungs Ataxie, Wien, 1863.

[3] London Med. Times and Gazette, February 6th, 1869, p. 141.

We have usually made use ourselves of a solution grains to the ounce, and have found it abundantly s applied either by means of a piece of sponge fasten handle, which is the best method, or a camel's hair pen as the end of the little finger. The application shou twice, or even three times in the course of the twenty-f

Hydrochloric acid is also frequently employed, eithe with from one to ten parts of honey; the more dilute fo the case of children.

It possesses the great advantage over the other mine caustic action does not extend much from the point of open to the objection of causing a white plastic exudati the mucous surface, not covered with false membrane, w come in contact, which may lead the physician into err

When the limits of the pseudo-membrane can be seen i lowing M. Bretonneau's advice, the acid may be used m and the sponge, after being dipped into the acid and s be merely moistened, should be carried rapidly into t withdrawn after lightly cauterizing the surface.

When, on the contrary, the limits of the membrane ca acid should be more diluted, and leaving more of it upo should be passed down over the epiglottis and then pr base of the tongue, by raising strongly the handle to w order to express a few drops upon the mucous membra The cauterization is to be performed once or twice a d the necessity of the case. For children under ten years o ought to be about half as large as a pigeon's egg. It i to a piece of flexible whalebone, by making a crucial introducing into this the end of the whalebone, and secu sealing-wax, which is not acted upon by the acid as an be. When about to be used, the whalebone is warmed

pplications of powdered alum, tannic acid, and chlorinated lime, are
mmended by writers of high authority. In slight cases, in which the
ase shows but little disposition to extend, such applications may an-
r very well; but when the attack is threatening, and especially when
exudation is spreading, we should neglect these minor remedies, and
rt at once either to nitrate of silver, dilute muriatic acid, or the
ture of the chloride of iron. If, however, these powders are em-
ed, they may be applied by means of a throat brush, or by causing
fficient quantity to adhere to the forefinger of the right hand, and
veying it upon this to the diseased surfaces.

he astringent and caustic preparations of iron have lately been intro-
ed in the treatment of this affection with much benefit. They cause
pseudo-membranes to contract and shrivel, and thus favor their sepa-
on, while at the same time they modify the action of the mucous mem-
e, and also tend, as does the sol. sodæ chlor., to correct the fetor
ing from the putrefaction of the false membranes, and to prevent poi-
ing of the system by absorption.

he tr. ferri chloridi and the ferri perchloridum are among the best
arations, and may be applied, either pure or diluted, several times in
course of twenty-four hours. Monsell's salt, in powder, has also been
ly recommended by Beardsley, of Connecticut, and possesses the
e mode of action, though somewhat more escharotic.

arbolic acid, diluted with glycerine and water, applied by a mop to
throat, appears to possess almost equal virtue in causing the separa-
of the pseudo-membranes, and preventing their re-formation.

arious applications have also been recommended from the fact that
exercise a direct solvent power over the pseudo-membranes, and
promote their removal. Among those which have been thus recom-
ded are solutions of lime, potassa, and soda; solution of chlorinated
; of chlorate of potash or soda; of permanganate of potash; of bro-
of potassium; of pepsin; and of dilute lactic acid.

r. Jacobi (*Amer. Jour. of Obstet.*, May, 1868, pp. 13–65), has pub-
d an analysis of the relative value of these solvent applications.
rding to him, lime-water requires four to ten hours to thoroughly
fy soft diphtheritic exudation; while for firm pseudo-membranes, it
res from thirty to seventy-two hours. Potash and soda, and their
act more slowly; and the one other application which he recom-
s as equally rapid in its action is a solution of bromine gr. i, bromide
tassium gr. i, in f℥vi of water.

e have carefully tested the latter solutions, as well as those men-
d above, and from the results of repeated tests, have concluded
lime-water is the most powerful in its solvent action upon pseudo-
branous exudations. We have frequently found, when fragments of
white exudation have been placed in lime-water at a temperature
lower than that of the buccal cavity, that the exterior began in a very
time (half an hour) to undergo disintegration, and that the whole
ent was reduced in a few hours to a granular putrilage. It is, how-

ever, undoubtedly true that this effect will be produced w ent rapidity upon different specimens of pseudo-membrane.

There is no real difficulty in making use of any of these if the children be properly managed. One or two assist the patient in such a way that the head shall be thrown b the hands and feet secured. The physician must depres with the handle of a spoon held in the left hand, while h right the pencil or sponge mop. If the child refuse to op it can generally be made to do so by holding the nose in or to breathe through the mouth. If this fail, all that is press the handle of the spoon against the teeth, when the pa become too much fatigued to offer further resistance.

*Gargles.*—When the patient is sufficiently old and int able to use gargles thoroughly, any of the substances wh recommended as local applications may be thus used, be largely diluted. Thus tr. ferri chl., hydrochloric acid, so nate, in the proportion of fʒi or fʒii to f℥vi, or chlorate strong solution, may be used as gargles with much advan cases.

These solutions may also be very efficiently applied to th finely divided condition, by means of the steam or hand a mode of application which is peculiarly useful in cases where membrane has extended to the larynx.

A very convenient and ready application, and one from whi obtained marked advantage in several cases, especially when tion had extended to the larynx, is by covering the patient's sheet, and introducing a vessel containing slaking lime, so th may be freely inhaled. It is probable that the chief benefit is from the warm watery vapor; though a small quantity of lime, of impalpable powder, probably gains entrance to the fa passages.[1]

*Ice.*—In a rather early stage of the disease, if there is m engorgement about the throat, cold, wet compresses may a rary relief; and great benefit is often obtained in cases wh much swelling and inflammation of the fauces and pharynx.

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[1] Bouchut has lately strenuously advised active cauterization of tion of the tonsils, not only for the purpose of removing the exudatio on them, which he considers the localization of the disease, but als respiration.

According to him, the operation of ablation has now been perform five by himself and ten by MM. Domere, Symyan, Speckahn, and Pa cessful results in each case, no false membrane reappearing.

Despite this favorable report, however, the procedure appears to regarding, as we do, the importance of the local condition as secondary alteration of the blood. The operation must further cause the grea most powerful resistance on the part of young children, and it seems able that a large proportion of cases should be attended with the same emption from a recurrence of pseudo-membranous formation, as occurre cases.

l use of ice, allowing the patient to hold small pieces of it almost ntly in the mouth.

er external applications may also be employed to reduce the swell- the cervical and submaxillary glands, render deglutition more easy, lieve suffering; and, in this way, the persistent use of poultices or iopiline fomentations are of service.

essential to remember, however, that all blisters, or irritating appli- s capable of destroying the epidermis, must be carefully avoided, to the tendency, already alluded to, of the pseudo-membranous it to occur on such abrasions.

en the nasal fossæ have become implicated from extension of the o-membrane, one of the dilute solutions recommended as gargles d be injected through the nostrils, or the desired effect may be even thoroughly secured by the use of the same fluid through a Thudi- 's nasal douche.

NERAL TREATMENT.—Whatever differences of opinion may exist in d to the relative merits of the various local applications we have erated, all high authorities are now agreed as to the general charac- the constitutional treatment which should be adopted.

me years ago, before opportunities had been presented for studying heria in its epidemic form, as it has since occurred, it was custom- o employ moderate depletion early in the attack, if the patient was ous and strong, and to follow this by the use of mercury and anti- istics, with a view of subduing the febrile excitement, and causing issolution and absorption of the pseudo-membrane.

th the increase of knowledge, however, of the true pathology and al history of the disease, which has been gained of late years, all ting and antiphlogistic plans of treatment have been, by common nt, abandoned as indefensible either in theory or practice, and all s are directed to promoting the nutrition of the patient and sup- ng the strength of the system, as indicated by the marked tendency ostration, the feeble pulse, and the manifest deterioration of the .

s probable that those cases in which bloodletting and the adminis- n of mercurials were adopted with such apparent benefit, were either eously considered diphtheritic, or that the disease, when occurring dically, as it formerly did, was of a far more sthenic type than it resented of late years.

garding diphtheria as a constitutional affection, depending upon a ar alteration of the blood, we must admit that we are in possession remedy which in any respect merits the name of a specific in its ment.

ong the best internal remedies, however, are the various prepara- of chlorine, iron, and bark, which may be given singly, or, preferably, bination.

us there are no remedies of more uniform and marked advantage sulphate of quinia and tincture of the chloride of iron, given in full at short intervals. Hydrochloric acid or chloric ether may be added to these tonics, and this combination is strongly recommended and other high authorities.

The Sanitary Commission, in London, reported very of a mixture containing tincture of the chloride of iron, with potash, chloric ether, and hydrochloric acid, sweetened with doses being employed according to the age of the patient, and repeated. This combination has been, by Gibb, rendered stimulating by the addition of muriate of ammonia.

Oil of turpentine has been recommended (Dr. Perrey, *Med. Gaz.*, March 5th, 1859) in large doses, both for its stimulating from its tendency to promote the absorption of lymph in advanced of the system, where mercury cannot be given.

Chlorate of potash, given in Huxham's tincture of bark, vaunted as almost specific in the treatment of diphtheria; marked by West, it unquestionably fails to produce here the effects which are obtained from its use in ulcerative stomatitis.

Permanganate of potash, which has been so extensively years in zymotic diseases, has been used both locally and this affection, but apparently without any very positive advantage.

*Emetics; Purgatives.*—Emetics are useful when the exudation disposition to extend to the larynx, or when there is much breathing from tumefaction of the fauces, or from accumulated pseudo-membranous deposits. We would recommend under cumstances the use of alum or ipecacuanha, as recommended ticle on pseudo-membranous laryngitis; the emetic being repeated or twelve hours, if the same indication should continue or next

A purgative dose is useful at the commencement of the disease as an evacuant. After that period only such laxatives need ployed as may suffice to keep the bowels soluble.

*Stimulants.*—In the milder forms of diphtheria, where tions exist, the cases usually terminate favorably without any stimulants; but there are many cases, on the other hand, ized by pallor of surface, marked weakness of the circulation dency to prostration, great enlargement of the cervical extensive disease of the throat, where the pseudo-membranes decompose and assume a gangrenous appearance, and the quently albuminous, in which stimulants, freely administered, tively required.

In cases where such adynamic symptoms are present, we should early in the attack with the administration of the weaker employ the stronger forms as the disease advances and the the system succumbs more and more.

*Food.*—In no disease should more sedulous care be paid to the patient a proper amount of suitable nourishment; and, indeed absence of any remedy which can be looked upon as essential we must assign, perhaps, the most important part in the treatment diphtheria to food and stimulants. It is at least certain that cannot be administered in proper quantity, all other treatment

ıd hence it is our duty, upon finding that the pain and fatigue ex-
ced by the child when forced to take frequent doses of medicine
it utterly unwilling to take food, to abandon all strictly medicinal
ıent, and trust to sustaining the powers of the system by the free
stimulants and concentrated food.

cases where mechanical obstruction exists, or where all efforts at
ary deglutition are obstinately resisted from fear of the great pain
l by the act, nutritious and stimulating enemata must be imme-
y resorted to. These may consist of beef-tea, eggs beaten up in
brandy in the form of milk-punch, and, further, may be medicated
e addition of quinia. They should be given every three or four
, in rather small quantity, and not so concentrated as to irritate
owel. When thus administered it is quite possible to sustain life
veral days, until food can again be introduced into the stomach.

addition to the local and general treatment above recommended,
atient should be rigorously confined to bed during the whole treat-
, and for at least ten days after the disappearance of the exudation.
caution is given, not only on account of the danger of that most
accident, the formation of a heart-clot, but because we have twice
n the exudation to reappear when the patient has been allowed to
the bed at too early a period; and in one of these the exudation ex-
d into the larynx on the occasion of the second attack, in spite of
at could be done, and life was saved only by the operation of trache-
y.

e most scrupulous cleanliness of the person and surroundings of the
nt should be preserved; free and uninterrupted ventilation secured;
on account of the positive, though perhaps slight, contagiousness
phtheria, it is wise to practise separation of the well children in the
y from the sick.

e treatment required in those cases where the pseudo-membrane ex-
s into the larynx, and especially the discussion of the indications for
peration of tracheotomy, will be found in detail in the article on
do-membranous laryngitis.

*eatment of Paralysis.*—We have already stated that the prognosis
phtheritic paralysis is usually favorable, the symptoms often dis-
aring in the course of time without treatment. The cure may, how-
be much hastened by a persistence in the administration of iron
uinia, to which strychnia may advantageously be added.

rate of silver has also been employed in full doses with apparent
it.

e paralyzed muscles should be faradized daily; and, when accessible,
athing or sulphur baths may be employed with advantage.

those cases where the muscles of deglutition are especially affected,
the nutrition of the patient is suffering from his inability to swallow
ient food, it is desirable to resort to the use of nutritious enemata.

*reatment of Heart-Clots.*—Under the supposition that the blood is
rinotic in the latter stage of diphtheria, the various salines, especially
egetable ones, such as the citrates and acetates, and ammonia, given

either as the carbonate or in the liquid form, have been re Richardson.

When, however, the symptoms indicate that deposition absolutely occurred, it is probable that nothing can be d of curative treatment. Alkalies may be given internally ammonia inhaled, alkaline solutions injected into the veins little reason to hope that any effect upon the clot can be p

In one of the cases reported by us (*loc. cit.*), the clot pre extremity a granular, partially disintegrated condition, as moval had begun by interstitial action, and the mechanical blood current; and it is possible that by supporting the pow the removal of the clot might be effected in this way.

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## ARTICLE III.

### MUMPS.

**DEFINITION; SYNONYMES; FREQUENCY.**—Mumps is an acute cific disease, contagious and epidemic; occurring but once vidual; attended by an inflammation of the parotid and some submaxillary glands, with a tendency to metastasis to the males and to the mammæ, vulva or ovaries in females; and ably resulting in recovery.

Some authors, as Niemeyer, object to classifying mumps wi tional diseases; but the fact that it undoubtedly possesses the enumerated in the above definition, and which, in the present knowledge, must be regarded as specifically characteristic of of affections, seems to us to fully entitle it to be included wi general diseases.

Mumps is known under a variety of names in every langu terms usually employed to designate it by English and Amer are cynanche parotidea, parotitis, parotiditis, and inflamma parotid.

It will be impossible to obtain any definite idea as to the fr this affection, until the system has been introduced of regis merely deaths but all cases of disease, since mumps is scarcely Its frequency is, however, known to vary very widely in differ owing to epidemic influences; so that while in certain years we meet with a single case, in others we are called to a considerable

**CAUSES.**—Nothing is known in regard to the essential na cause of mumps. The disease is, however, unquestionably and it quite rarely happens that one member of a family sic mumps, without some of the other children being attacked.

Mumps rarely occurs as a *sporadic* affection, but appears as stated, in *epidemics* of varying extent and severity, at time

to a single locality or even a single institution, and at others
g large cities or districts.

n appears to exert a powerful influence upon the development
ivity of the specific poison of mumps, since the epidemics occur
always in the spring or autumn. According to Vogel, it is said to
emic on the damp coasts of Holland, England, and France.

also exerts an unquestionable influence, by modifying the suscep-
to the contagion of mumps. Thus the disease is far most common
n the ages of seven and fifteen years; whilst it is almost unknown
the end of the first year, comparatively rare between the ages of
d five years, and, on the other hand, quite rare in adults.

ough it appears certain, however, that the susceptibility to the con-
of mumps diminishes with each succeeding year after the age of
, we must in great part explain the rarity of the disease in adult
y the fact that a large proportion of people have had it in child-
and are thus protected against a second attack.

ond attacks of mumps are indeed of extreme rarity.

ATOMICAL APPEARANCES.—Opportunities very rarely occur for the
ination of the parotid glands in mumps, since this disease is scarcely
atal. Virchow,[1] who has shown that, in cases of symptomatic sec-
y parotitis, the affection starts in the gland-ducts, maintains that
iopathic form occupies the same seat. Bamberger,[2] on the other
, states that the whole gland appears enlarged and reddened, with
sues swollen and flaccid, owing to an interstitial exudation of lymph.
softness and indolent character of the swelling, however, the fact
it usually extends beyond the borders of the gland, and its usually
and complete subsidence, all induce us to believe rather that there is
t catarrh of the ducts, with mere œdema of the interstitial and sur-
ding connective tissue.

is only in rare and very severe cases that there is sufficient lymph
ed to undergo organization and lead to persistent increase in the
f the gland, or to so compress the ducts as to induce atrophy of the
gland tissue. In even more rare cases, it is said that suppuration
occur.

MPTOMS.—In some cases the attack of mumps is preceded for a day
o by slight prodromes, consisting of restlessness, feverishness, loss
petite or vomiting; in excitable children, symptoms of nervous dis-
nce may occur. More frequently, however, the local symptoms
r simultaneously with the fever, and we have generally found posi-
swelling of the parotid gland upon our first visit to the child.

e earliest local symptom is often pain, complained of under the ear
creased by pressure and by all movements of the jaw, as in masti-
n. There is also stiffness felt in opening the mouth. The swelling
rs first immediately beneath the ear; the depression between the
id process and the ramus of the jaw quickly becomes filled, and the
ing rapidly extends on to the cheek and neck. At first the swelling
t, indurated, and presents the outlines of the parotid gland; but

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[1] Quoted by Niemeyer (op. cit., vol. i, p. 486).

[2] Quoted by Vogel (op. cit., p. 118).

it soon becomes prominent, the most marked projection observed immediately anterior to the lobe of the ear, and the limits of the affected gland. The central part of the sponding to the parotid, remains firm, indurated, and elastic, while at the periphery it is softer and often pits The degree of enlargement varies much in different cases. moderate and confined to the parotid region, while in other tends over a large part of the neck and face, and may be especially when both glands are affected simultaneously, head and neck a pyramidal shape.

Quite frequently the submaxillary glands are involved, ing consequently extends along the base of the jaw; in more the enlargement is most marked in this region, or, indeed maxillary glands may be almost exclusively the seat of the

The skin over the seat of enlargement is at times scarcely color, or may present more or less marked redness. There only very moderate tenderness on pressure. The pain the attack varies greatly; in some cases it is merely a tension and pressure, while in other instances, it has been as constant and severe, and extending even to the chest The movements of the head are impaired, and those of the peded to such an extent that the mouth can only be slightly mastication is performed imperfectly and with great difficulty.

Usually the swelling increases for from three to five days, acme for a day or two, and then rapidly subsides, so that in days the face has regained its natural appearance.

Mumps usually involves both parotids, though they rarely affected simultaneously; the left gland is said to be most first inflamed, and subsequently, in twenty-four or forty-eight even when the swelling has disappeared from the side first opposite gland becomes enlarged. Occasionally the not undergo complete resolution, and a circumscribed, swelling remains for a variable time in the parotid region. In cases, suppuration is said to have occurred. The salivary variously affected, and may be either diminished or excessive, unaltered. Occasionally the external swelling is associated with ment of the tonsils and œdema of the submucous tissue of the In such cases the difficulty of deglutition is much increased, may even be marked obstruction to respiration.

GENERAL SYMPTOMS.—Usually the constitutional disturbance is but slight and subsides even before the swelling of the Until the disease reaches its height, however, there is fever with dryness of the skin; the pulse and respiration are accelerated, petite impaired or lost, and the thirst usually extreme. There be, especially in nervous children, marked restlessness, sleepless the pain and discomfort caused by the great swelling of the face, and even mild delirium at night. As already mentioned, these febrile symptoms usually disappear about the fifth or six e of the most curious features in parotitis is the tendency which ionally exhibits itself to metastasis. The parts which are liable to us secondarily inflamed are the testicles and scrotum in males, and iammæ, the vulva, and the ovaries in females. The most frequent of metastatic inflammations in mumps is the affection of the testicle, h is much more common in men than in boys, is usually seated upon ame side with the enlarged parotid, and is attended with enlarge- of the body of the testicle, serous effusion into the tunica vaginalis, œdematous swelling of the scrotum. The swelling of the parotid narily subsides when any of these metastatic affections appear, but sionally the two inflammations continue together, a circumstance h shows, as Niemeyer points out, that they are in reality due to a non cause, and that no true transference of inflammation takes place one point to the other. In some instances, the swelling of the tid subsides a variable time before the development of the metastatic tion, and, during the interval, alarming symptoms of depression and bral disturbance have been noticed, and at times referred to a metas- to the membranes of the brain. There is, however, no actual men- is present, and upon the redevelopment of the external swelling, e nervous symptoms disappear.

OGNOSIS; DURATION; COURSE; TERMINATION.—Idiopathic parotitis umps almost invariably terminates favorably. The duration of the varies from four or five days in very mild cases, to ten or twelve in e ones. As already stated, the inflammation usually terminates in lete and rapid resolution. In some cases, however, a larger amount mph is formed in the interstitial tissue of the gland, undergoes par- rganization, and causes a hard, painless swelling, which persists for time. In some epidemics, suppurative degeneration of the gland een noticed, and the abscess which formed has either opened out- ly or into the external auditory meatus.

AGNOSIS.—The acute febrile character of the affection, and the pecu- seat and shape of the swelling, always serve to render the disease ly recognizable.

EATMENT.—As mumps almost invariably runs a favorable course, the ment should be of a mild and expectant character.

e child should be strictly confined to bed; the diet should be fluid, y on account of the great difficulty in mastication, light and diges- consisting chiefly of preparations of milk and light animal broths. only internal remedies required are febrifuges, such as spirit of us ether and solution of acetate of ammonia, with a free supply of and acidulated drinks; occasional laxatives; and, if there is sleep- ess, small doses of Dover's powder or some other anodyne.

cal applications appear to have little or no influence upon the course e swelling. The only ones to be recommended are warm, light poul- or light water-dressings covered with oiled silk, which do not annoy hild, and tend to favor resolution. If the induration be marked and nsive, so as to threaten suppuration, it has been advised to apply a leeches behind the angle of the jaw. If it should become evident

ance make their appearance after the sudd
swelling, the effort may be made to redevel
by stimulating applications to the surface,
tration of nervous and diffusible stimulants
brandy.

After the acute symptoms of the attack
has fully entered upon convalescence, we wc
it to leave bed too soon, since we have occas
ture exposure to be followed by marked fel
case, occurring in an adult, there was mark
in another case, in a child, there was high
a third case, also in a child, there was most
ing for four days; so violent, indeed, that
complication might have been developed; o
urine was found to be entirely normal.

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## ARTICLE IV.

### RICKETS.

**Definition; Synonymes; Frequency.**—Ric
ease peculiar to childhood, which first manifes
ances of nutrition, and later by a specific alte

This disease has been known under a vast
different languages;[1] almost the only terms b
English or American authors, however, are ric

It is not without surprise that we have read
especially by English authors, in regard to th

e calculate that of 128,656 children treated during thirteen years
6), not less than 8419, or 6.5 per cent., were rachitic; and in some
ie proportion of such patients rose as high as 9 per cent.

scribing the symptomatology of rickets we shall have occasion to
ow varied are the degrees and forms in which it manifests itself,
ubtless many of the cases tabulated by Hillier presented but a
legree of severity. Even with this explanation, however, we can-
id the conclusion that rickets must be a vastly more common af-
among the poorer classes in London than among the same classes
large American cities; nor can we say that our own experience
with that of Jenner, who further says that he has "very often
in the children of the wealthy." It is at least gratifying to be-
hat our experience represents the true state of the case; to be-
hat, owing to the better accommodations and larger size of the
, the better quality and the greater abundance of the food of the
classes in American cities as compared with European or English,
ape to a great extent the ravages of this fatal disease.

the other hand, it is probable that the slighter degrees of rickets
uite frequently present themselves and be overlooked, owing to the
rative neglect with which this important subject was, until very
ly, treated in works upon diseases of children.

fact that during the past nine years the mortality returns of this
ontain but two deaths reported as from rickets, is of little impor-
since so rarely is it assigned as a cause of death even in Great
n, that the Registrar-General has not found it necessary to devote
mn of his tables of mortality to the disease. "The secondary dis-
" as Hillier says, "are recognized, such as bronchitis, collapse of
ngs, atrophy, measles, hooping-cough, or convulsions, but the pri-
disease, which renders these secondary diseases fatal, is ignored."

shall limit ourselves to an account of the causes, general symptoms,
reatment of the disease, with a brief description of the anatomical
es in the bones, and the deformities which result, referring the
r who desires more minute knowledge on these latter points, to any
elaborate memoirs published on this disease.[1]

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CAUSES.—Considerable difference of opinion exists upon whether rickets is hereditary or not; but there seems n show that it ever is so, in the sense, for example, in which ilis is hereditary. There can, however, be no doubt as to fluence exercised by the health of the parents upon the the disease.

It is stated by some authors that too early marriages, or tween relations, and chronic tuberculosis or constitutional father, predispose to it. These causes are, however, of and certainly are inoperative as compared with the very exercised by the condition of the mother. Thus, it is well that whatever tends to induce debility and anæmia in the frequent pregnancies, or prolonged lactation, renders it next born children will be rickety. Thus, Jenner states common for the first, or the two or three first born childre from any sign of rickets, and yet for every subsequent child which he explains by the fact, "that among the poor the par ally worse fed, worse clothed, and worse lodged, the larger their children; and among the rich and poor alike, the larger of children, the more has the mother's constitutional strength and the more likely is she to have lost in general power."

In addition to the tendency derived from the mother, there ous causes acting directly upon the child, which strongly the disease. These will be found to be nearly the same as favor the development of tuberculosis. Thus, premature substitution of improper food for the mother's milk; or, on the the continuance of suckling long after the proper period for after the mother's milk has deteriorated in quality and become and unwholesome; or the use of indigestible, or of poor, nutritious food at any period during early childhood, are all of rickets. So too, many of the acute and chronic diseases which impair assimilation and nutrition, as entero-colitis; depressing influences as impure water, foul air, poor damp, and dirty habitations, may be classed among the causes.

SYMPTOMS.—It is highly doubtful whether rickets ever the birth of the fœtus. During the first four or five months the disease is very rare, while in the great majority of cases

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rance between the fifth month and the end of the second year, after
it becomes annually less and less frequent, and may be said to
arise after the close of the seventh year.

e alterations and deformities of the bones, which are so character-
of rickets, are not developed until after a more or less marked
ctic state of system has persisted for a time, varying from a few
s to several months.

ring this initiatory stage, the most marked symptoms are connected
the digestive system. The appetite may remain good or grow ca-
ous; and the bowels are irregular, though for the most part of the
there is diarrhœa, with stools which are at first greenish and mucous,
equently serous, watery, of a brownish or slate color, and horribly
sive. If this chronic intestinal catarrh be but slightly marked, the
may retain a good deal of its fat, though frequently there is ex-
e emaciation.

e next symptom which makes its appearance is general soreness and
erness of the body, with pain on movement, so that the child dreads
moved or even touched, cries if its limbs be pressed firmly, and
ie almost motionless for hours.

e head is frequently bathed in profuse perspiration, which occurs
ially during sleep, but also after any exertion or even while the
is lying quiet. The skin of the trunk and extremities is hot and
and even the lightest covering seems oppressive to the little pa-
; so that there is a tendency to get rid of all the bed-clothing at

the disease begins before the completion of primary dentition,
evelopment of the teeth is always impeded, and they are not only
ate, but either decay or fall very early from their sockets. The
does not present any constant alteration, but in a certain propor-
of cases the amount is increased, and there is an excess of the phos-
c salts, while in other instances excess of some free acid, said to be
ly lactic, has been detected. The mental condition in rickets has
variously described; some authors regarding the intelligence as pre-
us, owing probably to the isolation of the patient from other chil-
and its constant association with its elders; while others assert
here is an actual deficiency in intellectual capacity and power. At
ewhat later period of the disease the child acquires a peculiar staid
edate aspect, which, when associated with the unusual breadth and
eness of the face, imparts a strange expression of age.

cording to Roger and Rilliet, a blowing murmur may frequently be
l over the anterior fontanelle in this disease, synchronous with the
ial pulse. As, however, this murmur is to be heard in other condi-
, and is often absent in cases of rickets, it cannot be considered as
n of any positive value. The causes which appear to intensify it,
he anæmic state of the blood and the patency of the anterior fonta-
; yet Hillier states that he has found it present in thirteen, and ab-
in twenty-nine rickety children whose fontanelles were open.

e phenomena above described, when present in the same case, may

bones of the upper and lower extremities, giving
as at the ankles and wrists, a peculiar knobby doul
With this, there is such a degree of softening of
yield readily to pressure.

If the disease reaches this stage before the chi
there may be no deformity of the lower extremit
cases where the little patient has already been walk
bend so that they become markedly convex forwar
the same forward direction, while the knees may b
giving to the legs a series of curvatures. The forv
femora may indeed be produced before the child
weight of the legs and feet, which hang pendant fr
the child sits in its mother's lap or on a chair.

The bones of the upper extremities also share i
thus the humeri bend at the point of insertion of th
weight of the arms when raised by the action of the
the humeri and the bones of the forearms become be
which the child makes on its open palms to assist it

The clavicles are very constantly deformed, and
vature; one curve being forwards and somewhat upw
outside of the attachment of the sterno-cleido-masto
being backwards, and seated about half an inch fr
vicular articulation.

By far the most important deformities, however,
by the head, spine, thorax, and pelvis. The peculi
head in rickets is distinguished, are thus described b

1st. By the length of time the anterior fontanell
the healthy child, it closes completely before the exp
year. In the rickety child, it is often widely open a

2d. By thickening of the bones. This is usually
outside the sutures, the situation of the sutures bei

ig is so extreme that the pericranium and dura mater come in con- These "soft spots," first observed by Elsässer (*loc. cit.*), have been ted to the pressure of the enlarging brain, but are more probably erely to irregular deficiency of ossification.

curvature of the spine varies according as the child is able or to walk. In the latter case there is a posterior curvature of the beginning at the first dorsal, and extending to the last lumbar ra; while if the child is able to walk, this posterior curvature is d to the dorsal region, but is combined with an anterior curvature lumbar region. The cervical anterior curve is increased, and con- ntly the face is directed upwards, and the head falls backwards, eing unsupported, owing to the muscular debility, sways loosely side to side. Jenner points out that these curvatures may readily stinguished from angular curvature, by the fact that the weight of egs will usually remove them if the child be held by the upper part e trunk, especially if the physician at the same time raises the lower with one hand, and places the other on the curved spine.

e thorax is subject to deformities, which in a practical sense exceed hers in importance, owing to the serious interference which they ion with the action of the heart and lungs.

the first place, owing to the curvature of the spine, the ribs are ned laterally, and run forwards more horizontally, so that the lateral eter of the chest is greatly diminished, while the sternum is carried rds, and thus the antero-posterior diameter of the thorax is in- ed. In addition, there is a marked groove on either side of the m, extending from the first to the ninth or tenth ribs, along the line action of the ribs with their cartilages. These grooves are produced e bending of the ribs where the dorsal and lateral portions unite; which point they pass forwards and inwards to unite with their ages, which curve outwards before uniting with the sternum.

e curvatures and deformities which have been described before this, iefly due to the action of muscles or the weight of dependent parts; he production of the last-described deformities of the thorax is at- ed by Jenner chiefly to the atmospheric pressure, which, during in- ion, causes recession of the most yielding part of the thoracic walls, he softened ribs at the line of junction with their cartilages. In quence of the support which the liver, heart, and spleen furnish to bs corresponding to their position, the groove extends further down e left than on the right side; but is deeper over the fifth and sixth n the right than on the left side.

e pelvis is frequently affected in rickets, and the deformities which , on account of the great interference they cause in childbirth in male, rank next in importance to those of the thorax. The rickety s is characterized by a shortening of the antero-posterior diameter, at the upper strait assumes an oval form, or is at times heart-shaped. treme instances the sides also approximate, and give to the pelvis a gular shape. It is evident that the form will be influenced by a num- f conditions; as the stage of ossification, and the direction in which the pelvis is compressed by the spine from above, and th from below.

Partly in consequence of the diminished capacity of th pelvis, partly in consequence of the weakness of the abdom the flatulent distension of the intestines, and the enlargem and spleen which are frequently present, the abdomen is inent in rickety children.

During the development of the alterations in the bones, the toms before described persist; the digestion is enfeebled, liquid and fetid; the emaciation and debility increase; th more or less embarrassed by the deformities of the thorax quick, small, and irritable; the skin hot, excepting on the where it is still frequently bathed in sweat; and the gener of the body is aggravated.

In cases where the disease approaches a favorable ter earliest signs of improvement consist in a decrease in th debility, and suffering; the stools become more healthy, an symptoms, if any have been present, disappear.

During this stage of early convalescence, when the child leave the bed and walk about, holding on to the chairs, danger of increased curvature and even of partial fractures the lower extremities.

When, on the other hand, death occurs during the course is rarely from the intensity of the cachexia (which explains anomaly of so fatal a disease being scarcely represented in returns), but from the supervention of some secondary dis these, the following are enumerated by Jenner as the most fr of death:

1. Catarrh and bronchitis, which are rendered far more da the mechanical interference with respiration caused by th thorax.
2. Albuminoid infiltration of various organs, especially and lymphatic glands. This peculiar form of degenerati frequently developed during the course of rickets: it manif increased emaciation, extreme pallor, occasional œdema and and enlargement of the affected organs.
3. Laryngismus stridulus, which, according to Jenner, is connected rather with the nervous irritability due to ricket the tardy and difficult dentition which is itself but another of the constitutional disease.
4. Chronic hydrocephalus.
5. Convulsions, depending like the laryngismus stridulus heightened irritability of the nervous system.
6. Persistent and severe diarrhœa, which is probably due in to albuminoid degeneration of the intestinal mucous membr

DURATION; PROGNOSIS.—The duration of rickets varies that the disease may be said to present an acute and chronic

When the diathesis is marked, the hygienic conditions

nfavorable, and the disease makes its appearance at an early age,
urse is often very rapid, and death usually follows. When, on the
hand, the disease does not begin till late in the second or third
and when the surroundings of the child are more favorable, recovery
y occurs, although the disease may last for several years.

unfavorable prognosis may be made, then, when the disease begins
y early infancy; when it is attended with marked constitutional dis-
nces; when the deformities of the head and thorax are rapidly and
mely developed; when any of the secondary morbid conditions above
erated have supervened. When, on the other hand, the reverse of
conditions obtains, recovery may be expected, though often only
prolonged illness.

AGNOSIS.—It is only during the initiatory stage of rickets, that the
nature of the attack is likely to be mistaken. But during this stage
isease may be confounded either with chronic entero-colitis, or with
culosis of the peritoneum and intestinal canal. Careful attention
e peculiar symptoms of rickets, especially the sweating of the head,
eneral soreness and tenderness of the body, and the retardation of
tion, will, however, lead to a correct diagnosis, even before the
ng of the sternal ends of the ribs and of the epiphysial lines of the
bones, and the projection of the sternum, remove all doubt as to the
e of the case.

*bid Anatomy.*—The essential lesions in rickets consist of the changes
bones, though there are also certain lesions of the viscera which
equently met with.

bones affected by rickets in addition to the deformities already
bed, are clumsy, and present marked swellings at the line of their
on with the epiphyses. This enlargement is due to excessive de-
ment of the spongy tissue in the extremity of the bone and the epi-
s, and to marked proliferation of the epiphysial cartilage. The fact
he epiphyses widen instead of elongating, is due to the pressure of
perimposed parts upon the soft proliferating layers, causing them
ge laterally.

e deposition of calcareous granular particles at the line of ossifica-
s also wanting, and the cartilage cells calcify before the matrix be-
to ossify, and are converted into bone cells.

re is thus excessive formation of the structures which precede or
the nidus for ossification, while there is at the same time retardation
complete performance of that process.

the same time, the diaphyses present rarefaction of their tissue,
wing to undue softening and removal of old bone, but simply to the
that, while the old layers of bone are consumed by the normally pro-
sive formation of medullary cavities, the new layers which are pro-
d are soft and do not ossify.

he medullary space may reach the line of ossification, or even project
nd it into the proliferating epiphysial cartilage.

he periosteum of rickety bones is usually thickened and highly vas-
r.

The bones themselves become so soft that they may be [illegible] rection, or even cut with a knife without difficulty.

Upon section the spongy tissue and the enlarged [illegible] filled with a crimson pulp, containing blood-globules, a [illegible] free fat in some cases, and very many round, faintly [illegible] one or two nuclei.

The softening of the bones is fully accounted for by the [illegible] the proportion of their calcareous salts. Thus Jenner states [illegible] the analyses of several observers, that the bones of healthy [illegible] about thirty-seven parts of organic and sixty-three of [illegible] whereas those of rickety children yield about seventy-[illegible] ganic to twenty-one parts of inorganic matters. In [illegible] would appear that the organic matters themselves undergo [illegible] it has been found by several experimenters that the bones [illegible] rickets yield neither chondrin nor gelatin on boiling.

The thickening of the flat bones is caused by the [illegible] osseous layers from the thickened and vascular [illegible] formed at or near the growing margins of the bones, thus [illegible] the thickened ridges near the sutures of the cranial bones.

In addition to these changes in the bones, which are the [illegible] essential lesions in rickets, there are certain lesions of the [illegible] quently met with, which depend partly upon the deformities [illegible] ton and partly upon the general cachexia. Thus, in [illegible] peculiar deformity of the thorax, the anterior borders of the [illegible] highly emphysematous, while the band of lung-tissue [illegible] the deep groove at the sternal end of the ribs is [illegible] lapsed.

This peculiar and constantly present strip of collapsed [illegible] the recession of the corresponding part of the ribs during [illegible] but frequently there is also found extensive collapse of the [illegible] rior parts of the lungs from the ordinary causes, bronchitis [illegible] respiration. Jenner has also called attention to the frequent [illegible] rickets of white spots upon the pericardium, near the apex [illegible] These spots thus correspond to the depressed part of the [illegible] and are in all probability due to the friction of the heart [illegible] knuckle of bone.

In some cases, as already said, the organs, as the liver, [illegible] lymphatic glands, gastro-intestinal mucous membrane, &c., [illegible] seat of albuminoid (amyloid of Virchow) degeneration. [illegible] larged, firm, with a peculiar doughy elasticity, and often bear [illegible] of contiguous viscera: upon section but little blood [illegible] surface is pale, compact, and homogeneous, with a peculiar [illegible] lucent appearance. Jenner regards this change as [illegible] described by Virchow under the name "amyloid [illegible] he has failed to obtain from such organs either a blue, violet [illegible] reaction, with iodine and sulphuric acid. Dr. W. H. [illegible] recently read before the Medico-Chirurgical Society of London [illegible] that the enlarged viscera in cases of rickets give no reaction [illegible] ribes the change which they present as due, not to the presence ormation foreign to their structure, but to an irregular hypertro- ch alters the natural proportion of their tissues; and as differing, gically and clinically, both from the amyloid change and from the ment of the spleen and lymphatic glands known as Hodgkin's

ses where death is directly due to any secondary disease, as bron- ntestinal catarrh, or chronic hydrocephalus, there will of course d in addition the lesions common to such affections.

IOLOGY.—The description which has been given of the symptoms ts, clearly establishes the fact that it is a constitutional disease, in ne sense that scrofula and tuberculosis are; and we are conse- to regard the lesions of the bones as merely a local manifestation general cachexia. We are unable, however, to advance beyond this since we are ignorant, not only of the essential nature of the vice of n, but equally so of the specific nature of the changes in the bones. result of chemical analysis has led to the theory that the disease ally consists in a deficiency of the calcareous salts of the bones; attempt has been made to explain this deficiency by supposing ss of lactic acid in the primæ viæ and blood, which holds the cal- salts in solution, and prevents them from being deposited in the Apart from the purely hypothetical nature of this supposition, entire inadequacy to explain many of the most serious symptoms ts, it is to be borne in mind that the excess of free acid in the far from being constant, and that the changes in the bones are erized not merely by a deficient deposit of the calcareous salts, their abnormal position, and by all the evidences of an active vital

n, the marked vascularity of the bone and periosteum, the rapid ation of cells, and the pain and constitutional irritation which the disease, have induced others to regard the process as an in- tory one. But this view is controverted as well by the etiology nical history of the disease as by its constant anatomical results.

TMENT.—In cases where there is reason to anticipate the develop- rickets, as where the previous children of the mother have be- rickety, the utmost attention must be paid to the feeding and e of the young infant. If careful examination of the mother's roves that it is unsuitable in quality, a wet-nurse should be imme- provided, or, if that be unattainable, the child should be fed upon lly selected cow's milk, or upon one of the substitutes for human described in the article on thrush.

too, after the disease has made its appearance, the most appro- , nutritious, and digestible diet must be selected, care being taken t shall contain a large proportion of animal food.

e teeth of rickety children are so defective that, when they begin to solid food, it is highly necessary to insure its complete mastication, n cases where the condition of the teeth renders this impossible, the should be chopped finely and bruised in a mortar.

vegetable tonics, or wine of iron, with mild astringents a
indicated.

The remedy, however, from which most benefit is usu
cod-liver oil, and it should consequently be given, in co
iron and vegetable tonics and a small amount of some gen
soon as the nature of the attack is recognized and perse
months, or until the disease is overcome.

The efficacy of cod-liver oil in the treatment of this dise
so remarkable that all other remedies formerly used have be
by it. Vogel asserts (*op. cit.*, p. 534) that, "Rachitis may be
use of cod-liver oil alone, even if the circumstances are in c
unfavorable." Rickety children usually tolerate the oil w
become so fond of it that they will willingly take large dos
cases, however, it disagrees with the stomach and is obstin
by the children; and when this happens, so important is the
of the oil into the system, that we should recommend its use b

There can be no doubt that when rickets is recognized
stages, and a suitable medicinal and hygienic treatment pro
tuted, it is usually curable in a comparatively short time.
ever, the diathesis is strong and the case overlooked until soft
bones has occurred, and deformities begin to appear, the trea
be persisted in for many months or even years. In such c
tunately, there is only too great probability of the deformities
and becoming permanent, even if death does not ensue from
current or superinduced disease.

In order to guard against deformities, the little patient sho
a firm, smooth mattress, and high pillows should be forbidden.
recommends that small children should be carried out in a ba
larger ones should be drawn about in a carriage provided with
Sitting up for any length of time, or attempts at walking, she
hibited until the bones have grown firm and inflexible.

## ARTICLE V.

### TUBERCULOSIS.

is subject has received from many authors upon diseases of children, ss attention than it merits, under the idea that it is merely a repe- , upon a small scale, of the same disease in the adult, and not pos- l of any individual characteristics. In fact, however, tuberculosis ildhood is an affection possessing characters and presenting symp- entirely special, and differing from its manifestation in adult life in causes, locality, and clinical history.

USES.—The causes which exert most manifest influence in its pro- on are hereditary tendency, and all those debilitating agencies which irectly or indirectly upon nutrition. Of these latter causes, early ing is the most prominent. Thus, we have met with a case where a hy woman, the mother of several vigorous children, all of whom she ursed, gave birth to one which she was unable to suckle, and this , after pining for some months, died of an attack of tubercular men- s. A bad quality of the nurse's milk, or improper artificial food weaning, also exert a powerful influence in the production of tuber- is; and not unfrequently its development has been traced to repeated ks of indigestion or diarrhœa.

has also a tendency to develop itself after certain acute affections, ially in children predisposed by hereditary influence. Of these dis- , rubeola, pertussis, typhoid fever, and, according to Greenhow, la, are most frequently followed by tuberculosis.

ere is still some difference of opinion in regard to the rôle which monia plays in the development of tuberculosis. When the two co- , the inflammation is by some regarded as a secondary affection, in- d by the deposit of tubercle in the lung; while by others it is held amongst predisposed children, it is the pneumonia which causes the lopment of tuberculosis of the lung. We believe that pneumonia oc- s each of these relations in a certain number of cases; but reliable tics upon this point are still too scanty to determine the exact pro- on.

ATOMICAL APPEARANCES.—The most frequent seats of tubercular sit in the child are the brain, constituting tubercular meningitis, h has already been treated of at length; the bronchial glands, the , and the mesenteric glands and peritoneum. It is, however, one of istinguishing features of tuberculosis in the young subject, that it is involve several viscera simultaneously, while not unfrequently the remain free. Thus, in 312 children in whom Rilliet and Barthez l a deposit of tubercle in one or more of the viscera, the lungs were y in 47; while in 123 similar instances in the adult, Louis only l one such exception.

*ality.*—In bronchial phthisis, which generally accompanies pul- ry phthisis, but also exists as a separate affection (though, ac-

opening into a bronchus. Ob
cification, however, are quite common terminations of b
and when the lungs do not become involved in the mor
may be effected by these transformations. Calcified tub
nated through a communication between the gland a
passages; and a few cases are also reported where th
chea, and even the pulmonary artery have been perforat
Most of these tuberculous glands are enclosed in a d
capsule, which may attain the thickness of one or two
ally quite vascular. This fibrous capsule is due to th
the originally delicate cellular investment of the gland.

*Pulmonary Phthisis.*—The anatomical characters o
lungs in children, present several peculiarities, as distin
same deposit in adults. Thus gray granulations and cr
cles frequently exist in the lungs, independently of each
other form of tubercular deposit. In the adult, Louis d
tubercles unassociated with gray granulations only in 2
or in 1.6 per cent.; and gray granulations alone in but
cent.; while in the child, Rilliet and Barthez found milia
out gray granulations in 107 out of 265 cases, or in 40
gray granulations alone in 36 instances, or in 13 per c
servations of West, "which are based on 102 cases, yie
the presence of miliary tubercles alone, and 17 of the
granulations alone in the tissue of the lungs."

The great frequency with which the so-called yellow i
is observed in early life constitutes another anatomical p
and Barthez, and West having found it in from 23 to 33
cases. This condition rarely exists as an isolated stat
conjunction with gray granulations and crude yellow t
unfrequently also with advanced tuberculization of the

The rare occurrence of cavities in the lungs is a mo g of very small tuberculous deposits, distinct, though in close prox- y, which forms small vacuoles, communicating with each other and the neighboring bronchial tubes. All three of M. Bouchut's cases ar to have been of this form.

addition to these two varieties of tuberculous cavities, there is still ird, produced by the simultaneous softening of considerable portions . lung affected with yellow infiltration. This action, which is most monly met with in very early life, and in cases which progress with t rapidity, pervades the whole of the tissue affected, instead of pro- ing a central cavity. Cavities of this kind sometimes form very kly, and involve large portions of lung, the whole of one lobe even g converted into a mere sac, with thin walls.

here is another form of excavation occasionally noticed, which is not e pulmonary vomica, but the result of the softening and evacuation tuberculous pulmonary gland. The diagnosis, however, may be ered easy by reflecting that a pulmonary cavity of such small dimen- s is hardly ever solitary, unless it proceeds from the softening of ercular infiltration, whilst the deposit of tubercle which takes place in neighborhood of a diseased pulmonary gland is always in the form istinct deposits, not of tubercular infiltration (West).

he last anatomical peculiarity, already alluded to, of pulmonary hisis in children, is its frequent complication with tubercular deposit he bronchial glands.

*eritoneum.*—Tubercular deposit on the peritoneum rarely or never urs without the presence of a similar disease in some other parts of economy. It may be either general or partial in its disposition, ugh it is far more frequently the latter. The deposit varies also in character, appearing generally in the form of yellow granulations or niliary tubercles, either isolated or united into small masses. Gray nulations, however, are also of quite frequent occurrence.

The relation which the tubercles bear to the peritoneum is not uniform, ugh they are more frequently found deposited on its surface than be- th it. In 86 cases examined by Rilliet and Barthez, the seat was as lows: intra-peritoneal in 40; extra-peritoneal in 22; both intra- and ra-peritoneal in 14; in the other 10 cases the exact seat was doubtful.

When the deposit involves the entire extent of the serous membrane, find the anterior parietes of the abdomen adherent to the subjacent uctures, and the viscera so matted together and adherent, as to form almost inseparable mass. More frequently, however, the tuberculiza- n is partial, and even limited to the vicinity of a single organ. The itoneum investing the diaphragm, especially that portion which is in tact with the liver or spleen, or the adjacent parietal peritoneum, is y often affected; and as tubercles rarely fail to be deposited in the itoneum covering these viscera, we find them firmly adhering to the phragm or abdominal wall.

In some cases the omentum is the chief seat of the disease, and may her present numerous gray granulations scattered through its folds, may be thickened or matted together from a kind of grayish tubercular infiltration, due to the coalescence of innumerable minute tions. It is more rare to find the tuberculization limited to merely causing adhesion of the adjoining coils.

In examining the adhesions which are almost universally between the various organs and portions of peritoneum them to present two elements. In the first place, the tuber on the adjoining surfaces gradually coalesce as they increase finally unite the surfaces by more or less extensive patches matter. And again, at the same time, the subacute inflam by their presence leads to the formation of cellular and fi as in cases of simple peritonitis. This is well seen in cases coils of the intestine present tubercular adhesions to each masses which can only be separated by rupturing the walls while between other coils the adhesions merely consist of easily lacerated cellular bands.

It is a well-established fact that the tubercular granulations face of the peritoneum have no tendency to perforate this me that the perforations which are occasionally found, especially of the intestines, are due to the development and softening peritoneal tubercles, which always tend to penetrate into its same law holds elsewhere, and it is on this account that which so constantly form between tuberculous membranes great value in preventing the escape of foreign matters into cavities. In the intestines this action can be traced even when tubercles exist under both layers of the peritoneum adhesion between two folds of intestine, as softening advances of peritoneum are destroyed, and the little collection of tuber remains confined only by the inner coats of the two layers Sooner or later these also break down, the softened tubercle is into the bowel, and a direct communication established betw parts of the intestinal canal, as between a fold of the ileum cending or descending colon. This perforation, then, is tuberculous ulceration of the mucous membrane; nor does this tion bear any fixed relation to the degree of tuberculization toneum.

There is generally some deposit of tubercle in the mesenter these cases; and when the splenic portion of the peritoneum we frequently find an abundant deposit in this organ.

Tuberculization of the *mesenteric glands*, or tabes mesent few anatomical features in addition to those present in bronc It is, moreover, far from being a frequent form of the disease. according to Rilliet and Barthez, some tubercle is found in the one-half of all tuberculous subjects, it exists in considerable in one out of every sixteen of the whole number. The deposit appears as infiltrated tubercle, though not unfrequently miliary are present. The glands attain a size varying from that of a pigeon's egg, and occasionally, from the aggregation of seven glands, a mass is formed double the size of the child's fist.

capsule which surrounds them is usually more delicate and less
r than the same structure in tuberculous bronchial glands. The
lar deposit here, as elsewhere, is liable to undergo calcification or
ng, the latter process being more frequently met with.

ng both to the yielding nature of the abdominal walls, which do not
the forward growth of the mesenteric glands, and to the mobility
adjacent viscera, we never see the same degree of compression
d on surrounding structures, as is noticed in tuberculization of the
ial glands.

asionally, however, adhesions may form between a tuberculous
teric gland and a fold of the intestine, and ultimately result in per-
n of the bowel.

hus describing these various lesions as being all tuberculous in
ssential nature, we have purposely employed this term in the some-
inaccurate and vague sense which was assigned to it until within
st few years.

ognizing, as we distinctly do, but one elementary form of tubercu-
leposit, the gray granulation or miliary tubercle, which may, it is
undergo cheesy degeneration, it is evident that many of the cases
ich extensive and uniform cheesy deposits are found, rather depend
scrofulous inflammation of the part than upon true tuberculous
tion. It is comparatively rare to meet with such cheesy deposits in the
in children, while, as already described, they occur very frequently
n the bronchial and mesenteric glands. And, therefore, we are dis-
to believe that in many cases of so-called bronchial or mesenteric
sis, the enlargement and degeneration of the glands is really due to
lammatory process of a low and unhealthy type, excited by the pre-
occurrence of attacks of bronchitis or enteritis, and leading to the
tion of a cacoplastic lymph which soon undergoes cheesy degen-
n.

s in this way, doubtless, that the comparatively numerous cases are
explained in which such deposits soften and are evacuated, or un-
partial absorption and calcification, and where ultimately the child's
is restored. We have preferred, however, in the present edition,
ctical purposes, to group the descriptions of these various condi-
under one common head, being unwilling to separate them until
extended study shall have more clearly demonstrated the degree of
blance which exists between true tuberculous matter and such caco-
inflammatory formations.

PTOMS.—The symptoms of tuberculosis in children may be studied
the forms of bronchial phthisis; acute and chronic pulmonary
is; and tuberculization of the peritoneum and mesenteric glands.

*nchial Phthisis.*—In addition to the general symptoms of tubercu-
which will be fully given under the head of pulmonary phthisis, the
marked symptoms of bronchial phthisis are those due to the me-
cal effect of the enlarged and hardened glands upon the surround-
ssues. Our knowledge of the functions of the lymphatic glands is
t so inaccurate that we are entirely unable to appreciate the symp-

toms of disordered action which are probably present in sive disease of these organs.

Bronchial phthisis occurs in its best marked form two and six years; and in many cases appears to be deve severe attack of bronchitis, either accompanying measles out apparent cause.

The cough which, in the early stage, is hacking and some, soon acquires severity and becomes intermittent, oxysms like those of pertussis.

The respiration becomes habitually labored and oppress longed wheezing sound, as in asthmatic cases.

The veins of the neck are often greatly distended, the coming extreme during the violent paroxysms of cough becomes puffy and œdematous, a condition occasionally ex upper extremities; and, as West points out, the superficial thorax become enlarged, just as those of the abdomen cirrhosis of the liver. The obstruction to the return of superior vena cava is further shown by the occurrence even of hemorrhage into the arachnoid; and the compress monary tissue occasionally produces hæmoptysis and Dr. Jenner has seen hydrothorax produced from compress azygos.

The œsophagus does not always escape the encroachment but may be so compressed as to produce dysphagia.

It is hardly necessary to say that so long as the tubercul mains small, it may exist without causing any symptoms, when several glands become stuffed with tubercle, enlarged they give rise either to the symptoms already enumerated, or ical signs below alluded to.

*Physical Signs.*—In estimating the value of these, it is constantly bear in mind the fact that the enlarged and tuber chial glands, while they still surround the trachea and into contact with the spinal column, or in a few cases, with From their solidity, and the consequent readiness with thrown into vibration, they transmit directly to the ear aggerate many respiratory sounds, which are in reality distance from the thoracic walls, and which are either dependent upon a small amount of disease.

It is also due to these relations, that the signs, both of and percussion, of bronchial phthisis are best detected at the lungs posteriorly, or at the level of the vertebræ with larged glands come in contact.

Our knowledge of these important considerations is chief investigations of Rilliet and Barthez.

*Percussion.*—In the young child in health, there is a resonance over the manubrium of the sternum, owing to the thymus gland; but, in some cases of marked bronchial dulness extends both downwards and laterally to a varying rce, owing to the projection of the enlarged glands into the an- ıediastinum.

generally, however, as we have said, the tuberculous glands are act with the spinal column, so that we find dulness on percussion nterscapular space as a pretty constant and characteristic symptom. rding to Dr. Jenner, it is common to have a cracked-pot sound on sing the cartilages of the upper three ribs on one or both sides. due to the fact that the enlarged glands accompanying the bron- ubes frequently extend under the anterior margin of the lungs, so n percussing, the air-containing lung is compressed between the nass of glands behind and the in-driven parietes in front, and the forced out suddenly from the healthy layer of lung, producing inking sound.

*cultation* often reveals true tubular breathing over the upper part sternum, extending almost to the base of the heart. In those cases a large bronchial tube is compressed or occluded, we of course n enfeebled or extinct respiratory murmur over the corresponding segment.

asionally the enlarged glands compress the superior vena cava, and ise to a permanent venous hum; or a systolic murmur, having its f greatest intensity at the second left interspace, may be produced nilar compression of the pulmonary artery.

ere is one characteristic, however, of this form of phthisis, which is ially dwelt upon by Dr. West, and which it is well to bear in mind, oid being misled. This is the frequent occurrence of great fluctua- in the condition of the patient; so that, even when the rapid breath- requent cough, emaciation and loss of strength would betoken a ily fatal issue, a pause will occur in the progress of the disease, g which the diminution of any bronchitic complication, with partial dis- rance of the dyspnœa and cough, and the return of flesh and strength e little patient, all tend to awaken delusive hopes. In the great ma- of cases, this respite is but brief, and the disease again resumes its rd course; but there are well-authenticated cases on record in which ravest symptoms have gradually disappeared, and the child has ulti- y regained fair health. In these cases, the tuberculous deposit may have undergone cretaceous degeneration, or, having softened and d an opening into a bronchus, have been expectorated.

e characteristics of bronchial phthisis, which we have been consider- re thus summed up by West:

The frequent development of its symptoms out of one or more at- of bronchitis.

The peculiar paroxysmal cough which attends it, resembling that cipient pertussis.

The great and frequent fluctuations in the patient's condition, and ccasional and apparently causeless aggravation both of the cough dyspnœa."

*mptoms of Pulmonary Phthisis.*—Valuable as are the general symp- of tuberculosis in the adult, it is in the young child peculiarly that they reach their highest importance, owing either to the abs difficulty of appreciation of many symptoms which aid gre diagnosis of phthisis in adult life.

It is necessary, therefore, to examine with the greatest care hereditary tendencies, its past history, and its appearance and development. Thus it is in cases of inherited tuberculosis its characteristic features most strongly marked, in the tall the firm bones, with small and yielding cartilages; the delic nous complexion; the fine, silky hair; the active, often prec ligence; the ease with which the general health is affecte causes, and the peculiar proneness to catch cold on the leas By careful attention to these and other similar points, as ma more, valuable information can be obtained in the phthisis than from the most careful investigation of the physical signs

In enumerating the symptoms, it is unnecessary to detail th exist in common with pulmonary phthisis in the adult, save any particular in which they may differ as seen in the young

The *cough* varies much in accordance with the varying amou chial irritation, being at one time scarcely troublesome, or so and accompanied with such violent dyspnœa, from some inter tack of bronchitis, as to threaten immediate death.

It not unfrequently has a somewhat paroxysmal characte accompanying tuberculization of the bronchial glands. One marked peculiarities of the cough in the phthisis of children is absence of expectoration, since the secretions are either retai bronchial tubes, or, if raised into the pharynx, are swallowed effort at expulsion.

*Hæmoptysis* very rarely occurs in the early stage or during the of the disease; and when it occurs as the cause of sudden dea to the complication with bronchial phthisis, rather than to the a bloodvessel in a pulmonary vomica.

The *temperature* of the body is, as a rule, higher than normal it presents fluctuations on different days, and even at different ho same day; at times being normal, and again rising as high as more. The greatest elevation of the temperature is generally night, and is usually accompanied by flushing of one or both che it is rare to find the colliquative night-sweats which prove so ex to adults.

The *pulse* is always accelerated, and becomes very frequent as perature rises.

The *appetite* is capricious, the tongue furred, and the digesti fect; the bowels alternate from a state of constipation to diarrh the stools are unhealthy in appearance, being generally pa clay-colored. Naturally, with this disturbed state of the prima trition is seriously impaired, and the child steadily loses flesh and Indeed, in very many cases, the little patient presents merely th toms of impaired nutrition, becomes languid and drooping, e, strength, and flesh, for many weeks before the development of reveals the lungs as the seat of the disease.

*ical Signs.*—We have already remarked the fact that in the inves- n of phthisis, the physical signs are of much less value in the case lren than in adults. This arises not only from peculiarities of the al and moral organization in childhood, but also from the mode in the tuberculous deposit takes place. Thus, as a rule, the deposit ercle in the lungs of children is more generally diffused and uni- so that we lose to a great degree the advantages derived in adults comparison of the results of auscultation and percussion in one with those obtained in another. For the same reason, we are also ed of those signs which, in the adult, are developed in a single as, for instance, the *coarse breathing*, which is of so much diag- importance as one of the earliest signs of the deposit of tubercle apex of the lungs.

other source of difficulty and error lies in the fact already alluded at the bronchial glands, when enlarged by the deposit of tubercle, constantly happens in conjunction with the pulmonary phthisis of en, are brought into contact with the thoracic walls, and transmit sounds with intensified force. It is thus that prolongation of the atory sound beneath the clavicle, and jerking respiration, lose much importance they have as signs of the early stage of phthisis in s. For although, when heard in children, they should always be ded as probable evidence of phthisis, they have frequently been d in cases whose progress shows the tubercular deposit to have at the most, trifling. In the same way, caution must be used not to ke the blowing sound, mixed with moist râles, which is thus trans- d from a compressed bronchial tube containing mucus, for a large ular vomica. The only way in which this mistake, and the con- nt too unfavorable prognosis, can be avoided, is by comparing daily esults of auscultation and percussion, and noticing whether they n exactly the same, or whether, while the dulness on percussion over larged glands persists, the results of auscultation vary from day to ith the varying amount of compression of the bronchus and the e of its contents.

still further source of difficulty results from the loss of all the in- ation which is derived, in older persons, from the vocal resonance its alterations. And again, owing to the excitability of children, nt and prolonged observation is required, both as to the situation, ee, extent, and duration of any inequality of breathing, before any lusion can be drawn from it.

nally, the extreme resonance of the thorax in early life tends to te the results of percussion by preventing the recognition of fine tions of sonority, such as are readily detected in more advanced life.

addition, moreover, to these numerous sources of difficulty in the cation of auscultation and percussion, we are compelled to add the hat there is not a single physical sign peculiar to pulmonary phthisis ildren; the dulness in the interscapular space in bronchial phthisis as scarcely to have interfered with nutriti functions, or to have attracted the least att

In such a state of system, death may b weeks by an acute development of tubercl lungs, it is not unfrequently attended by in parenchyma, constituting tuberculous pneu the view entertained as to the relation betw tubercular deposit, the recognition of this la importance, from its bearing on the treatme

In *tuberculous pneumonia*, in addition to past history of the child, we rarely find the lar excitement as in pure pneumonia. The chest is also, from the beginning, out of p bronchial symptoms with which the case sets both that the amount of inflamed lung-tissu for the dyspnœa, and that the râles develope mucous varieties, rather than the true fine cr pneumonia.

In the *chronic form* of phthisis alluded t longed during several years. They consis chronic cough, with or without expectoratio patient, and the physical signs of more or posit. In favorable cases, it is not unusual improvement to occur in the general sympt the child slowly regains good health, and diminish, leaving merely some dulness and where positive signs of advanced tuberculo

*Symptoms of Tuberculous Peritonitis.*— become implicated late in the course of gen be the first structure involved. Apart, how toms of the tuberculous cachexia which

ost invariably loose, or alternations of constipation and diarrhœa
; themselves, the stools usually being unhealthy in appearance.
, condition frequently appears to depend upon inflammation or
ılous ulceration of the intestines.

iting is not usually present; it is rarely spontaneous, and merely
s in the occasional rejection of alimentary matters.

in the abdomen has been mentioned as one of the earliest symp-
It is rarely constant or confined to the seat of the lesion, but is
shifting, intermittent, and colicky in its nature, recurring with
or less frequency. There is also tenderness on pressure over the
en, which becomes especially marked during the later stages of the
, though in some cases the abdomen remains indolent throughout.
ariable period after the appearance of the preceding symptoms,
metimes simultaneously with the occurrence of colicky pains, the
en undergoes a marked modification in its size and shape. It
es tense and large, and assumes an oval or globular form, the
sions and fossæ being all effaced. It generally retains its tympa-
ote upon percussion; and in proportion as the distension increases,
ınd becomes more and more tympanitic. The tension often varies
t any apparent cause; and when it is much diminished, an imper-
nse of fluctuation may be obtained by filliping the sides of the
en. This sign is rarely due to any ascites being present, but is
l doubt rightly explained by Rilliet and Barthez, as due to the
ission of the impulse of the hand by the agglutinated intestinal

only in very exceptional cases that even the most careful percussion
ation will detect any inequalities in the abdominal walls, due to the
ce of large tuberculous patches. In every case in which the last-
observers detected any abdominal tumor, the omentum was found
he chief seat of the tuberculous deposit.

r this condition of the abdomen has persisted some time, the dis-
l skin desquamates, and assumes a rough and dirty appearance.
ut the same period usually, the cutaneous veins of the abdomen
e prominent and dilated, owing to the obstruction to the abdominal
tion.

he case progresses, and the general symptoms assume more grav-
se local symptoms become more pronounced. Like all forms of
ılosis in children, however, the advance of this disease is rarely
n, and intermissions and fluctuations in the symptoms are often
l. Toward the close of life, all the symptoms usually undergo
ation, and the remissions become more and more rare and brief.

h is either produced by the advance of tuberculous disease in the
or by tubercular meningitis; or the little patient sinks from sheer
tion under the persistent diarrhœa and the repeated accessions of
eal disease.

*ptoms of Tuberculosis of the Mesenteric Glands.*—The symptoms of
ndition are even less positive and diagnostic than those of tuber-

The modifications of the size and shape of the abd
furnish useful information. It is rarely so large and
culous peritonitis, and its shape is rather globular thar

There is scarcely any tenderness on pressure over th
there is some accompanying peritonitis.

The only really pathognomonic symptom, indeed, is
the enlarged glands by palpation. This, however, is fa
sible in all cases, even when the bulk of the glands is
as they are frequently covered and concealed by the int

It is, in fact, only in those cases where the abdomen
laxed, that we can establish the presence of the tumor.
lobulated, varying in size from a hen's egg to a large or
in the neighborhood of the umbilicus.

The digestive system here also presents more or less
ances; the bowels in particular being loose, a condition
the existence of tuberculous ulceration of the intestine.

The general symptoms which accompany tuberculizati
teric glands alone, are often not so marked as when
affected; in fact, MM. Rilliet and Barthez assert that th
with a case in which this affection, isolated from all othe
any considerable emaciation.

Duration.—The duration of tuberculosis in children
been expected, varies considerably according to the p
roundings of the patients. In large hospitals, where th
not the advantage of the best hygienic influences, the m
terminate in from 3 to 7 months, though occasionally p
wards of 2 years. In private practice, on the other hand
chronic phthisis are met with, in which the disease co
or even 5 years before producing death. It is extremely d
any probable duration for either tuberculous peritonitis
terica, as they can rarely be diagnosed during the earl

ent interpretation of the physical signs, will, however, generally to prevent any serious error.

e earlier stages of the more acute forms of phthisis, the disease ich it is most apt to be confounded is remittent fever; from which be distinguished by the history of malarial exposure, by the defi- mmencement of the case, and by the very marked exacerbations ccur towards night, attended with high fever, great heat of skin, isiderable delirium. In its more chronic forms, the diagnosis of ary phthisis from chronic bronchitis is often attended with the t difficulty. In fact, the physical signs of the two conditions are tly so entirely analogous, that it is only by the general symptoms rculosis, the greater amount of hectic irritation, the more rapid ion, and the frequent supervention of tubercular deposit in other that a diagnosis can be established.

ave already dwelt upon the value of abnormal development of the n as a symptom of tubercular peritonitis. There are, however, ases of simple functional derangement of the intestines, in which icion of tuberculous deposit can be entertained, where this symp- lso noticed. It is due to this circumstance that tubercular disease eritoneum and mesenteric glands was formerly considered of such t occurrence. A careful regard, however, to the age of the patient; ple distension of the abdomen occurs generally in infancy, whilst lous peritonitis is most frequent after the age of 3 years; and to cts of simple remedies, will usually remove any doubt.

ases which are most apt to be confounded with tabes mesenterica e in which abdominal tumors, due to some other cause, are present. n extensive tubercular deposit in the omentum, we may have, in n to the general symptoms of tuberculosis, a well-defined tumor he middle of the abdomen. The greater degree of tenderness of lomen, and the mobility in this case, may, however, serve to dis- n it. Again, it is not rare to find in cases of digestive derangement, rregular action of the bowels with more or less pain may have esent, a distinct and only slightly movable tumor in the abdomen, he impaction of the intestine with hardened fæces. A careful con- on, however, of the position of these masses, which is generally in the other iliac fossa; their entire painlessness and doughy char- on palpation, and their complete disappearance after the admin- n of laxatives and enemata, will reveal their true nature.

NOSIS.—The very name of tuberculosis has grown, with only too eason, to be almost synonymous with impending, unavoidable death. t, while pulmonary phthisis shows the same fatal tendency in od as in adult life, the prognosis is somewhat less gloomy. For y does well-directed treatment occasionally render a deposit of e in the lungs, whose existence has been proved by the symptoms ncipient stage, inert and obsolescent; but in rare cases, where the has advanced to softening and destruction of lung-tissue, a cure n slowly effected by the evacuation of the softened tubercle and lual cicatrization of the cavity.

words will suffice to call attention to the various mode
brings about a fatal issue in children.

In the majority of cases, death occurs from sheer
powers of life, from impaired nutrition and perverte
few instances of bronchial phthisis, death is suddenly
hemorrhage, owing to the perforation of one of the
vessels.

The immediate cause of death is frequently found i
attack of bronchitis, pneumonia, or peritonitis; whil
the cerebral symptoms which precede the fatal event sl
branes of the brain have become the seat of tuberculou

It is not unusual, moreover, whether the original se
lous deposit have been in the abdomen or thorax, for
symptoms to be developed towards the close of the cas
ulceration of the intestines serving to maintain an u
exhausting diarrhœa.

Treatment.—*Prophylactic.*—In children whose par
lous, and who in early life give evidence of delicate h
laxis becomes most important. The infant should be ke
breast up to the age of fifteen or eighteen months; but i
be herself tuberculous, on no account should she be all
child, for whom a healthy wet-nurse should be imme
By attention to this precaution, we have succeeded in r
tuberculous mothers, who had suckled their previous
lost them all in early life from tuberculous disease.

As the child advances in age, every caution should b
and clothing, to securing sufficient exercise in the open
tilation in its sleeping apartment. When the circums
rents permit, it is of the greatest consequence that the c
the benefits of a country life, in some healthy, invigora
for four or six months out of every year.

sis in children, since the same indications present themselves as in
ts, and call for the same remedies. The most essential points in the
ment are attention to all hygienic conditions, careful regulation of
diet, and the administration of remedies calculated to improve nutri-
and primary assimilation.

is indeed impossible to over-estimate the importance of maintaining
appetite and powers of digestion; and if these show any sign of fail-
we should resort to some of the bitter vegetable tonics, of which, per-
s, the combination of tincture of nux vomica, gtt. ii to v, with the
pound tincture of gentian, ♏ xv to xxx, according to the age of the
d, is most desirable. On the other hand, if we find reason to believe
any remedy we are administering disturbs the nutrition of the child,
gusts it, lessens its appetite, or rouses violent opposition at every dose,
hould be instantly abandoned as producing the very effect we most
ire to avoid.

he child should be strongly encouraged to take nourishing food at
ular intervals, and so soon as any of the articles of its diet become
ttractive, other preparations of similar nature should be substituted.
k should enter largely into the diet, and ought to be taken at least
ry morning and evening. Tender, finely divided meat should be eaten
he mid-day meal, in such quantities as the digestion will easily bear.
marked signs of debility present themselves, a few drachms of good
ndy may be taken at intervals through the day, with advantage.

When the stomach does not reject it, there are few remedies whose
ion is more beneficial than cod-liver oil, given in the dose of a tea-
onful or even less, three times a day. In many instances, children
n become accustomed to the taste of this substance and even grow to
ish it almost as a luxury, and to take it eagerly; in some cases, how-
er, the taste is so unpleasant that the children refuse to take it, and it
therefore, advisable in such instances to prescribe it in the combina-
n recommended at page 325, at least during the first few weeks of its
ministration.

In those cases where it is impossible to administer cod-liver oil inter-
lly, very good results may often be obtained here, as well as under simi-
circumstances in other wasting diseases of children, by the use of the
by inunction.

Iron and its various preparations are strongly indicated, and we can
nerally find some of the milder forms which will be readily tolerated.
those cases where there is considerable implication of the lymphatic
ands, the syrup of the iodide of iron appears especially useful, and this
y be well given alternately or in conjunction with iodide of potassium.
Sea-bathing is strongly recommended, especially in the tuberculization
the glandular system; or when this is not attainable, baths in which
me tonic drug has been mixed.

In tuberculous deposit in the peritoneum or mesenteric glands, the diet
st be regulated with peculiar care; the most bland, unirritating, and
gestible food being selected. If, however, despite our precautions,
rrhœa should make its appearance, the various astringents in combi-

nation with opium should be given freely. The pain in the which is frequently so severe in these forms of tuberculosis, lieved by the application of sinapisms, or of warm anodyne by gentle friction with a sedative liniment.

When the symptoms of any intercurrent inflammation in organ present themselves, we must limit our treatment to the of a few cups or leeches over the part, and the administration stimulating diet, with some mild febrifuge. When the periton volved in the tubercular deposit, and we have reason to fear an of inflammation of that membrane, there is urgent necessity of topical depletion in moderation; but we must, at the same in mind the cachectic nature of the disease, and refrain from of any depressing plan of treatment.

## ARTICLE VI.

### CONGENITAL SYPHILIS.

Infantile syphilis may be either inherited or acquired sub birth. As, however, the characters of the latter form do not rially from those of acquired syphilis in the adult, we shall lim scription to hereditary syphilis.

Careful clinical observation appears to have clearly demonstr following facts with regard to the transmission of syphilis, in a the direct contagiousness of both the primary and secondary tations:

That the embryo in utero may be infected, if either of the have constitutional syphilis at the period of conception, whether the disease be latent, or if secondary or tertiary sym present. That if both parents are syphilitic the child will suffer from the disease, and in a more severe form. That if th though healthy at the time of conception, contract syphilis during six or seven months of pregnancy, the child will probably be That when the mother infects the embryo, the disease is prob severe than when the father alone is syphilitic, and thus such usually perish, and are prematurely cast off by abortion, so that majority of children with congenital syphilis have inherited it f father. While the last statement is almost universally admitt are some authors, as Hutchinson,[1] who do not admit the greater of the disease when the mother is the source of contagion. Finally syphilitic father may infect the ovum without contaminating the system, though the mother may subsequently herself be infected embryo.

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[1] Art. Constitutional Syphilis, in Reynolds's Syst. of Med., vol. i, pp. 2

In very many cases, though unfortunately not in all, the infected em- yo perishes, and abortion follows. When, however, such infants are born ing, they usually present no trace of syphilitic disease at birth, but y appear well-nourished and healthy. Occasionally, however, chil- en have been observed who presented, at the time of birth, copper- lored blotches upon the skin, condylomata, or mucous patches.

In the majority of cases the first symptoms of the disease appear be- een the fifteenth and thirtieth days after birth, though in many instances so during the second month. Thus, of 158 cases collected from various urces by Diday,[1] the disease showed itself—

| | |
|---|---|
| During 1st month in | 86 |
| " 2d " | 45 |
| " 3d " | 15 |
| At 4th month in | 7 |
| " 5th " | 1 |
| " 6th " | 1 |
| " 8th " | 1 |
| " 1 year, | 1 |
| " 2 years, | 1 |

So that 131 children out of 158 presented evident symptoms of syphilis fore the end of the second month.

Among the earliest evidences of the disease are the signs of failing trition. The infant, who has grown well, and has been plump and ap- rently vigorous for a few weeks, begins to emaciate, the features become nched, the skin assumes a dry, sallow, shrivelled appearance, and pre- nts patches of yellowish-brown discoloration, especially on the prominent rts of the face; the voice becomes feeble, whimpering, and plaintive, d the infant soon acquires a remarkable expression of premature old ge.

The appearance of the skin has been most minutely described by Trous- au,[2] West,[3] Diday, and others, and is in a high degree characteristic of e disease.

In addition, however, to these general symptoms of malnutrition, there on appear the signs of constitutional syphilis, familiarly met with in e adult, as well as some which are peculiar to the disease in infancy.

The symptoms now to be described belong partly to the secondary and rtly to the tertiary stage, for it is a peculiarity of infantile syphilis at the evolution of the symptoms does not follow so orderly a course in syphilis of the adult. The symptoms most frequently met with are rtain affections of the skin and mucous membranes. Among the cu- neous eruptions, pemphigus is one of the most characteristic. It is so the first eruption to appear, not rarely being present at birth, and ver, according to Niemeyer,[4] commencing later than the end of the st week of life.

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[1] Infantile Syphilis (Syd. Soc.), 1859.

[2] Clin. Méd., 2ème ed., 1865, t. iii, p. 291.

[3] Dis. of Children (4th Am. ed.), 1866, p. 577.

[4] Text-Book of Pract. Med. (Am. trans.), 1869, vol. ii, p. 706.

verge of the anus. These rhagades bleed upon stretching of the parts, l by their laceration so much pain is caused that, when the mouth is af-ed, the child dreads to smile, talk, or suckle; and when they are seated the anus, defecation is attended with extreme suffering. Occasionally gades form in the skin in the flexures of the joints, and especially in se of the fingers and toes.

Condylomata are also frequently present, and like the rhagades are st frequent at the orifice of the anus and mouth, though they may also m elsewhere upon the skin, as upon the vulva, between the scrotum d thighs, in the axillæ, and behind the ears.

In consequence, probably, of the softening and ulceration of these owths, large, sinuous, irregular ulcers may form in such positions, ex-nding for some distance into the surrounding skin.

In a few cases iritis occurs; and so too the deeper seated tissues of the obe, as the vitreous humor, retina, or choroid, may become inflamed.

Death very frequently ensues before the end of the first year, either in nsequence of the severity of the coryza and the inability to nourish e little patient, or in consequence of the profound cachexia and anæmia, the development of some of the visceral lesions, to be hereafter de-ribed. When, however, owing to judicious treatment, or the compara-ely slight development of the early symptoms, the child survives, the sease frequently subsides about the end of the first year; but often, ter remaining latent for a variable time, reappears in the form of ter-ry symptoms. According to Hutchinson, this tertiary epoch may begin any period after the fifth year, but is commonly delayed till at or near e period of puberty. In addition to the traces which may remain of e earlier symptoms, such as little pits and scars upon the skin, altera-ons in the form of the nose from long standing nasal obstruction, or tual disease of the nasal bones, there are several very characteristic mptoms amongst the later manifestations.

Among these is a peculiar alteration of the permanent incisor teeth, first scribed by Mr. Jonathan Hutchinson. Although we are not altogether sposed to attach the overpowering weight which Mr. Hutchinson does the evidence, furnished by this alteration of the teeth, of the existence inherited syphilis, there is no doubt that it is an important sign, and , therefore, quote in full his description of it (*loc. cit.*, p. 317):

"In these patients (those suffering with inherited syphilis), it is very mmon to find all the incisor teeth dwarfed and malformed. Sometimes e canines are affected also. These teeth are narrow and rounded, and g-like; their edges are jagged and notched. Owing to their smallness, eir sides do not touch, and interspaces are left. It is, however, the per central incisors which are the most reliable for purposes of diag-sis. When the other teeth are affected these very rarely escape, and ry often they are malformed when all the others are of fairly good ape. The characteristic malformation of the upper central incisors nsists in a dwarfing of the tooth, which is usually both narrow and short, d in the atrophy of its middle lobe. This atrophy leaves a single oad notch (vertical) in the edge of the tooth, and sometimes from this

Another valuable symptom of inherited syphilis at t which never occurs in acquired syphilis, is a peculiar or inflammation of the cornea, which has been tern *syphilitic*. It also is usually symmetrical, and is atten the corneæ from the formation of lymph in their substa mation usually subsides in a few weeks or months, lea opacities here and there in the substance of the cornes

Occasionally also there are symptoms indicative of g ease. The liver and spleen may be found enlarged and cases ascites is not rare. So too affections of the nervou limited to a single pair of cerebral nerves, as the audi deafness, or the optic, and causing amaurosis, are me stances.

Even now marked disease of the bones is rare, the frequently form upon the long bones; and in some few breaks out in the form of destructive lupus, or of serio bony tissues.

Morbid Anatomy.—The principal lesions found in herited syphilis, are in connection with the liver and lu other organs, as the brain or thymus gland, present evid The liver is at times enlarged, rounded, and indurate result of diffuse subacute hepatitis, or of infiltration of tl peculiar albuminous substance, called "amyloid," by comparatively rare in children to find gummy tumors substance of the liver, with thickening and cicatricial capsule, as are so often met with in visceral syphilis in

In the lungs, gummy tumors of various sizes form, an cheesy degeneration of their central portion; and there a form of consolidation, called by Virchow "white hep depends upon chronic catarrhal pneumonia, with infar vesicles with epithelial cells, in a state of partial cheesy d n, appearing a few weeks later; of condylomata and rhagades; and of yza, stomatitis and laryngitis. The general symptoms are also peculiar, ecially the physiognomy and the discoloration of the skin. And we uld, in addition, endeavor to confirm our suspicion by obtaining a clear tory of the parents' condition at the time of conception.

During the later periods of the disease, at or after the period of purty, the diagnosis is no less important, and far more obscure. We must w rely upon the history of the case, upon the condition of other chilen of the same family, upon the detection of traces of the earlier mptoms, upon the presence of the peculiar alteration of teeth described Hutchinson, of interstitial keratitis, of nodes, or of a symmetrical ection of some of the cranial nerves.

In deciding between the inherited or acquired nature of any case, the ints which will aid us are, the existence of primary disease of the other at the time of delivery (which is rare, and can rarely be discoved even if it have been present); the existence of secondary contagious mptoms on either the mother or the nurse who suckled the infant; the esence of notched incisor teeth or of interstitial keratitis, which are culiar to the inherited form; and the symmetrical distribution of all e secondary and tertiary manifestations, which is asserted by Hutchinn to be also an attribute of inherited as distinguished from acquired philis.

PROGNOSIS.—The most unfavorable conditions in inherited syphilis are, e infection of both parents; the appearance of the disease soon after rth, especially in the form of pemphigus; and the occurrence of rapid d extreme emaciation. On the other hand, if the father alone has condary symptoms and those of a mild character; if the disease do not ake its appearance till the third or fourth week; if the general nutrition is ot greatly impaired, and if proper treatment can be immediately instiuted, the prognosis is favorable, at least as regards preservation of life.

TREATMENT.—If the previous children of a mother have proved syphitic, it is well to subject her to a mild mercurial course during her pregancy.

In the treatment of the infant, every care must be paid to supporting s strength by the most nutritious diet, if it is unable to suckle the other. It is, however, improper to employ a wet-nurse, on account of e danger of her being infected by the child.

In regard to medicinal treatment, the use of mercury is universally ecommended during the presence of marked symptoms. The mercurial ay be given either in the form of hydrarg. cum creta; calomel; or ichloride of mercury, in solution in some aromatic water, or in syr. sarsæ. omp.; or, finally, it may be introduced into the system in the form of ercurial ointment by inunction. The most convenient mode of introucing it in the latter form, is by smearing a flannel roller with mercurial intment and binding it around the child, whose movements cause its eedy absorption.

The dose of the mercurial should be small, and it is to be continued eadily, though with caution to avoid producing salivation, until a decided improvement in the symptoms manifests itself. During [illegible] istration it will frequently have to be temporarily discontinued [illegible] of gastro-intestinal irritation.

So soon as the mercury is stopped, we should order the i[illegible] tassium or iodide of iron, either one or both together being [illegible] according to the toleration of the stomach.

We should also recommend the use of cod-liver oil, and [illegible] tion of cinchona, from an early period in the case; and [illegible] child suckles, a certain amount of Liebig's cold extract of [illegible] beef scraped finely and given as directed at page 373, should [illegible] istered.

The best local application to the sores is black-wash, though [illegible] dylomata usually require to be touched occasionally with [illegible] silver.

# CLASS VI.

## ERUPTIVE FEVERS.

### ARTICLE I.

### SCARLET FEVER OR SCARLATINA.

DEFINITION; FREQUENCY; FORMS.—Scarlet fever is an epidemic and ntagious exantheme, characterized by continued fever; by a scarlet sh, which, appearing on the first or second day of the disease, ends ually about the sixth or seventh, or in rare cases as late as the tenth, d is followed by desquamation; and by simultaneous inflammation of e tonsils, and of the mucous membrane of the mouth and pharynx.

The frequency of the disease is exceedingly variable in different years, ving to its epidemic nature. This may be readily seen by a glance at e following table, which gives the annual mortality for the past sixty ars in this city, from scarlatina and measles:

| | Scarlatina. | Measles. | | Scarlatina. | Measles. | | Scarlatina. | Measles. |
|---|---|---|---|---|---|---|---|---|
| 1809 | 3 | 0 | 1829 | 9 | 53 | 1849 | 242 | 27 |
| 1810 | 2 | 1 | 1830 | 40 | 7 | 1850 | 440 | 72 |
| 1811 | 3 | 2 | 1831 | 200 | 23 | 1851 | 391 | 17 |
| 1812 | 1 | 20 | 1832 | 307 | 118 | 1852 | 434 | 90 |
| 1813 | 0 | 1 | 1833 | 61 | 1 | 1853 | 388 | 14 |
| 1814 | 0 | 9 | 1834 | 83 | 7 | 1854 | 162 | 62 |
| 1815 | 0 | 7 | 1835 | 305 | 248 | 1855 | 163 | 24 |
| 1816 | 0 | 2 | 1836 | 240 | 4 | 1856 | 992 | 141 |
| 1817 | 0 | 0 | 1837 | 205 | 49 | 1857 | 704 | 66 |
| 1818 | 1 | 0 | 1838 | 134 | 123 | 1858 | 241 | 28 |
| 1819 | 2 | 108 | 1839 | 225 | 136 | 1859 | 232 | 51 |
| 1820 | 31 | 47 | 1840 | 244 | 2 | 1860 | 591 | 15 |
| 1821 | 13 | 0 | 1841 | 83 | 119 | 1861 | 1190 | 74 |
| 1822 | 9 | 0 | 1842 | 220 | 24 | 1862 | 461 | 109 |
| 1823 | 11 | 156 | 1843 | 395 | 1 | 1863 | 275 | 82 |
| 1824 | 9 | 102 | 1844 | 269 | 3 | 1864 | 349 | 90 |
| 1825 | 9 | 88 | 1845 | 199 | 90 | 1865 | 624 | 54 |
| 1826 | 4 | 101 | 1846 | 221 | 6 | 1866 | 491 | 221 |
| 1827 | 1 | 9 | 1847 | 344 | 77 | 1867 | 367 | 83 |
| 1828 | 0 | 58 | 1848 | 172 | 99 | 1868 | 224 | 108 |

It will be noticed that for five successive years, 1813–17 inclusive, not single death from scarlatina is reported; and that during twenty years, 1809–28 inclusive, only 99 deaths occurred from this cause; single years 1856 and 1861, 992 and 1190 deaths respecti ported. During the entire series of sixty years, there have deaths from scarlatina returned.

Hillier states, that during the eighteen years from 1848 to deaths from scarlatina in London amounted to 52,461.

It is impossible to estimate the actual relative frequency tina and measles, owing to the absence of any returns of non- It is evident, however, from the above table that, although the from measles is also very variable, and thus may for a short that from scarlatina, in a long series of years the latter dise more fatal. Thus the number of deaths from measles, in this the past sixty years, amounts to but 2279.

MM. Guersant and Blache (*Dict. de Méd.*, t. 28, p. 173) state less frequent than measles or variola. They added together the the eruptive fevers collected in 1838 and 1839, by MM. R and Barthez, and Barrier, in the Children's Hospital at Paris, that there had only been 157 of scarlet fever; whilst there measles, and 213 of variola and varioloid.

The *forms* of the disease generally enumerated are the *simp* and *malignant*. Authors differ widely in their descriptions of the forms. Many of the English authors include in the simple form cases in which there is no affection of the fauces, while the ang includes all in which there is any throat affection whatever. M on the contrary, describes under the head of the simple form th which the throat affection is mild, while he considers the ang to be that in which a pseudo-membranous angina occurs. descriptions of the malignant form are vague and uncertain. cluding under this term only the rapidly fatal cases in which symptoms are present, while others include those also which ar malignant by the occurrence of pseudo-membranous angina.

We believe this division of scarlet fever into distinct forms ties to be, for several reasons, a faulty arrangement. It is not to us, in the first place, consonant with the nature of the disease. fever is, in fact, with all its degrees of severity, and apparent a single and distinct fever, produced by one cause, determinin effects, howsoever much they may vary in degree, and requirin than does typhoid fever to be divided into the variety of differ which it has been customary to ascribe to it. Again, the above division is not, we are sure, a good one for practical purposes. possible, indeed, as we have often found it, to refer many cases with in practice, clearly and satisfactorily to any one of the forms ease described in books. The simple form of some of the English that in which there is no anginose affection, has no existence so far as we have been able to discover. We believe that infla of the mucous membrane of the fauces constitutes an essentia of the disease; for we have never yet seen a case of scarlatina was not present to a greater or less extent. It is often very slight, so ght, indeed, as to be unaccompanied by any evidence of pain in the rt, but in all that we have examined, it has been decided and obvious. is supposed form of the disease does not, therefore, in our opinion, ist.

The two other forms usually described,—the anginose and malignant, also of little value practically, since we have found that in all severe grave cases, in which the patient did not die with violent nervous mptoms under the first shock of the scarlatinous poison, there has been veloped a severe and dangerous anginose inflammation about the third fourth day; so that it is fair to say that we cannot imagine any malignt case, lasting over the third or fourth day, which is not anginose, r any severe anginose case, which might not also be styled, from its ngerous character, malignant. We have found it impossible, in our perience, to draw the distinction clearly and indubitably between the ginose and malignant varieties, because all severe cases partake more less of the features of both.

Feeling this difficulty of describing the disease according to the mode at had before that time been generally followed, and believing it also to insufficient for practical purposes, we were led to attempt, in the first ition of this work, a different arrangement.

We made, accordingly, two forms or degrees of the disease, which we signated by the terms *regular* and *grave.* In the first form or degree included all the cases in which the angina was simple and the erupn regular in all respects; in which there was no predominance of one t of symptoms over another, but in which all held a due relation to each her. In this form was embraced all the cases of scarlatina simplex of iters, and many of those of scarlatina anginosa of the English authors. the second form we included the cases which departed from the regular urse of the disease, and which were rendered dangerous by the occurnce of severe symptoms not belonging in the same degree to the simple fection. This form we subdivided into two varieties, the *grave anginose,* hich contained all the cases accompanied by pseudo-membranous, ulcerave, or gangrenous angina; and the *grave cerebral,* which comprised all ose marked by the early occurrence of dangerous cerebral symptoms. he grave form comprehended, therefore, some of the cases of scarlatina ginosa, and all those of scarlatina maligna of writers, dividing, hower, those in which a pseudo-membranous, ulcerative, or gangrenous gina determined the type of the attack, from those in which the cereal or nervous symptoms gave to the case its stamp.

More extended observation and more patient reflection have taught us at this division also is incorrect,—that it does not afford a good classiation for the purposes of description, and that it is defective as a guide practice.

We adopted, therefore, in the last edition, and shall follow in the present e, a different method of considering the disease, one which we believe to more consistent with its nature, more suitable for the purposes of descripence in the degree of severity they exhibit.

CAUSES.—It has been abundantly proved by lo
vation that scarlatina is propagated by two ca
*demic* influence. Of these two modes of propag
least doubt ourselves that the latter is by far the
necessary to look over the results afforded by the
this city, as quoted in the early part of this artic
in some years the disease caused a heavy mortalit
one, and that in others again not a single death fr
convinced that it is of a highly *epidemic* nature.

The *contagious* character of scarlatina has bee
persons, but seems to us clearly proved by the
various writers. Our own experience also convi
tagious disease, though much less so, we are sure,
measles, hooping-cough, or chicken-pox. We ha
deed, known children exposed directly and for a
time to the infection to escape entirely, while it i
to meet with children, unprotected by previous a
the contagion of measles, hooping-cough, or vari
believe it to be much less highly contagious th
supposed, and than the other contagious disease
also well convinced, as was stated above, that i
considerable extent by a direct contagion. We h
stances, known one child in a family to contract t
exposure to it, or from the epidemic constitution o
a second, third, and even a fourth, to take the di
five, seven, or nine days after the latter had fall
stances, on the contrary, it would seem that eith
one family contract the disease nearly simultaneo
influence, or else that the period of incubation is

The period of incubation is shorter than in other contagious eruptive seases. It may be stated to vary between twenty-four hours and two three weeks. MM. Guersant and Blache are of opinion that in the ajority of cases, it is from three to seven days. MM. Rilliet and Bar- ez found that of 38 cases in which the time was recorded, it was be- een 2 and 7 days in 16, between 8 and 13 in 15, and 15 and 40 in 8 ses. Our own observation would fix it at from 9 to 15 days in the ajority of cases.

Occasionally, however, it is very short; thus Trousseau mentions a se in which the evidence is almost conclusive that the period of incuba- on was less than twenty-four hours. Murchison also states that this tent period varies from a few minutes to five days, rarely, if ever, ex- eding six days.

It is impossible to state with any certainty the length of time during hich the power of imparting the contagion continues in the patient. M. azenave (*Abrégé Prat. des Mal. de la Peau*, p. 54), states that it lasts roughout the period of desquamation, and that it would even seem to most active at that time.

Whatever may be the duration of this period, it is certain that the virus n attach itself to clothing, bedding, or furniture, and that the disease n thus be transmitted by a third person who is not himself attacked. e also learn from some remarkable instances, as, for example, from a se related by Richardson in "*The Asclepiad*," that when the virus is us attached to fomites, it may retain its activity for many months.

In regard to the essential nature of the poison, it appears probable, in e first place, that it is contained in the secretions of the skin and fauces. The distance to which it may be carried by the air does not appear to ceed a few feet, and in those cases where prompt isolation does not revent the communication of the disease, the virus has either been pre- iously imbibed or is carried by fomites. It is probably of material na- ire, and is admitted to the system either through the skin, the respira- ry, or, perhaps, the gastric mucous membrane.

As we have seen, it retains its activity for a long time; but is rendered ert by a temperature somewhat below 212° F.

Scarlatina is stated to be also inoculable, by the blood, the secretion om the fauces, and the fluid from the miliary vesicles which occasion- lly form on the skin. The resulting disease appears in some instances have been favorably modified, but the operation has been comparatively arely practised.

The epidemics of scarlet fever vary exceedingly in their extent and iolence. During the years 1842 and 1843, the disease prevailed very xtensively in this city, and assumed a malignant type, so that in a con- iderable number of families, two, three, and even four children, died ithin a very short period.

During the winter of 1856-7, and throughout the spring of 1857, we ad one of the most prevalent epidemics that ever visited this city, and et the proportion of deaths to the whole number of cases in our own

practice and that of our friends, was such as to seem to
type of the epidemic was mild.

The disease prevails at all seasons, but is most frequent i
and summer, and next in the autumn. It rarely occurs m
in the same individual, but that it does so sometimes, is pro
brought forward by different authors. It has been asserte
attacks of scarlet fever occur in the same person not more th
a thousand cases. Of the truth of this assertion we are, h
doubtful, since it has occurred to us to see no less than th
of second attacks in our own experience. We attended in
child with perfectly well-marked scarlet fever, attested by
anasarca, who had had the disease two years previously un
of the late Prof. C. D. Meigs. In the winter of 1852, we att
children in one family with the disease, one of whom died, a
whom had had the disease four years and a half before. Th
tended in the first attack by one of ourselves, and as it chanced
our absence from town during one day, they were seen also by
friends, who made no exception whatever to the diagnosis of s
The only doubt as to these cases having been veritable examples
attacks of the disease, must rest of course upon the diagnosis
first example, the diagnosis was made by Prof. Meigs in the
and by one of ourselves in the second. In the two latter it was
one of ourselves in both, accidentally confirmed in the first att
children, by the opinion of a competent professional friend. T
tacks in the latter cases were both mild, but well marked; the se
both severe, and one proved fatal on the sixth day. We have n
doubt ourselves that all of the three were cases of true scarl
they were not, the two latter must have been cases of roseola,
resembling scarlatina as to oblige us to confess ourselves inc
distinguish between the two diseases. What adds to the cert
the two which came under our own observation were examples
fever, is the fact that they occurred simultaneously with a third
same family. Now, roseola is not apt, so far as we know, to
demically in a household. Most of the cases of that disease tha
seen, have been solitary ones. Again, in the spring of 1857,
saw a well-marked attack of the disease in a boy nearly four y
who had had it one year before, under the charge of a perfe
petent practitioner.

Dr. Richardson (*loc. cit.*) asserts that he has known the dise
twice in the same patient, and also states that he himself ha
from it three times.

*Age.*—MM. Rilliet and Barthez state that it is most common
to ten years of age. Of 251 cases that we have seen, in which
was noted, 64 occurred under 3 years of age, 78 between 3 and
51 between 5 and 7, 47 between 7 and 10, and 11 between 1
From this it would appear to be more common in the first five y
between the ages of five and ten, since of the 251 cases, 142 oc

mer, and only 98 in the latter period. By uniting the statistical
of Dr. Emerson with those of Dr. Condie (*Dis. of Child.*, 2d ed.,
. 86), we obtain the deaths from scarlatina in this city at different
r a period of thirty years. These tables show clearly that the dis-
most common between the ages of one and five years. The total
ity from scalatina under ten years, during the time stated, was
f which 132 were under one year of age, 411 between 1 and 2, 1130
n 2 and 5, and 510 between 5 and 10.

48,829 cases collected by Dr. Murchison from the death returns of
Britain, 9999 or about 7 per cent. were under 1 year; 30,974 or
cent., under 2 years; 95,070, or 64 per cent. under 5 years; 38,591,
er cent. between 5 and 10; and but 13,168, or about 9 per cent.,
ges above 10.

agrees quite closely with the averages calculated from the extensive
es collected by Dr. Richardson, which show the following percent-
different ages:

| | |
|---|---|
| Under 5 years, | 67.63 |
| From 5 to 10, | 24.43 |
| " 10 to 20, | 5.52 |
| " 20 to 40, | 1.73 |
| " 40 upwards, | 0.66 |

of 12,962 deaths under 5 years, 1289 or 9.9 per cent., were under
; 2874 or 22 per cent., between 1 and 2; so that 4163 or 31.4 per
were under 2 years.

earliest age at which we have seen it perfectly well marked, was
-one days. We saw it once also in a child five months of age, and
t the age of six months. It is not nearly so common in the first
f life as it is afterwards. The largest number of cases occur, ac-
g to our experience, in the third, fourth, and fifth years of life.

influence of *sex* seems not to have been determined with certainty.
weedie (*Cyclop. of Pract. Med.*, art. Scarlatina), says it is most
n in girls. MM. Rilliet and Barthez, on the contrary, state it to
re common in boys. Of 262 cases under 15 years of age that we
een, in which the sex was noted, 133 occurred in males, and 129 in
s. The truth is, probably, that under puberty it attacks the two
with about equal frequency, while after that age it is most common
ales.

ccasionally happens, that patients, both adults and children, who
ndergone surgical operations, are attacked with a scarlatinous rash,
ild constitutional symptoms (Hillier, Gee). The disease, accord-
these authorities, is true scarlatina; and its occurrence at that time
ly depends upon the system being in an unusually favorable con-
for the reception of the virus.

PTOMS; COURSE; DURATION.—As has already been stated, we in-
n our description of the symptoms of scarlet fever, to depart from
linary mode of arrangement of the subject. We shall discard the old
n of the disease into three forms or degrees, scarlatina simplex,

ous symptoms in the form of diphtheritic, ulcer
flammation of the mucous membrane of the fauc
which the general symptoms assume a low and typ
it seems convenient, we shall follow the usual di
the disease into the three stages of invasion, erup

*Mild Cases.—Stage of Invasion.*—The follow
symptoms of scarlet fever in its mild form is dra
but much more from our own observation of 206 m
of all of which we have kept a faithful record, an
thing peculiar or important, full notes.

The onset of mild cases of scarlet fever is gene
is well, or so slightly ailing on one day, as that th
condition is not noticed at the time, though it m
wards, and on the following day, or often within tw
the symptoms of the disease become marked and ch
majority of the cases that we have seen, the erupt
at our first visit. Frequently the patient has been
evening, and, becoming restless and feverish in th
following morning with fever, sore throat, and very
or, as happened in one of our cases, a child gets
parently well, breakfasts as usual, goes to church,
there, comes home and a few hours later shows the
and upper part of the trunk, and has fever and s
case, a boy between seven and eight years old wa
morning. At 2 P.M., his mother, a most sensible
observed him playing in the garden, and rema
looks. Fifteen minutes after this he felt sick at
into the house and went up to the nursery, look
with a cold skin, and nearly fainted in the nurse's
the course of an hour three copious and watery
panied with vomiting. We saw him one

symptoms, we find that the first one observed in most of the cases ver, marked by considerable acceleration of the pulse and heat of . In some few cases the fever is preceded by the ordinary prodromes brile diseases, languor, lassitude, pains in the back and limbs, and t rigors. Simultaneously with the fever there is in nearly all cases or less soreness of the throat. In all that we have examined, even e in which no pain was complained of, there has been redness, or ess with swelling of the fauces. In a majority of the cases vomiting rs, or if not vomiting, some degree of nausea. There is complete exia; the thirst is acute; the bowels are usually in their natural con- n, or slightly constipated. The child is quiet and dull, or else rest- and irritable, and sometimes there is delirium; the face is generally ed, and the eyes often slightly injected. The duration of these symp- s is irregular. They are said to last generally about a day, but they continue either a shorter or longer period. We are very sure, from own observation, as we have already stated, that these preparatory ptoms rarely precede the eruption more than twelve hours, and very the time is even less, so that the eruption may even be the first ptom noticed.

*age of Eruption.*—The eruption generally appears first on the face neck, whence it extends rapidly over the whole surface. It con- s to increase in extent and intensity, so as to reach its maximum t the third or fourth day. It appears first in minute dark-red points d upon a rose-colored surface, forming patches of irregular shape, nsiderable size, level with the skin, disappearing under pressure, led at first by portions of healthy skin, but running rapidly together, giving to large portions of the surface a uniform scarlet color. The tion is not generally equally diffused over the whole body, but is more ked upon one portion than another. It is often most intense on the k, and is there of a deeper color than elsewhere, not unfrequently as- ing a purple hue. It is generally very well marked on the abdomen thighs, and about the articulations, and assumes in those regions a ticularly bright tint.

t does not always cover the whole surface, but in some very mild es, and, as we shall find when treating of the grave cases, in these er, also, it may occur only in patches of moderate extent upon differ- portions of the body, leaving us at times in some doubt as to the real ure of the rash.

he surface of the eruption is smooth and even to the touch, unless, as unfrequently happens, it is accompanied by the development of mili- vesicles, or crops of minute pimples or pustules. A certain degree oughness is sometimes occasioned also by enlargement of the papillæ he skin in various parts of the body, particularly on the extensor sur- e of the limbs; but these are evidently independent of the characteristic ption. The skin upon some parts of the body, especially the face, ds, and feet, often presents a swollen appearance, rendering the move- nts somewhat stiff. There is in most cases a feeling of burning, irri-

in the great duration of the white line so
however, to have any positive value in dis
many forms of erythema.

The eruption generally reaches its heig
then remains stationary for one, or less fr
it begins to decline. Its decline is marke
sity of the color, which, from scarlet, becon
growing paler and paler, finally disappe
seventh, or eighth day. In some very m
duration of the eruption is not over two or
color it imparts to the skin is never very
accompanied by intense heat, or by much i

The symptoms which preceded the erup
pearance, but persist or are augmented. T
unabated; the pulse is full, strong, and fr
after the onset to 120, 140, 150, and often t
pulse is, in fact, one of the most marked s
have rarely, even in very mild cases, found
few it has been in the first few days, and in
old even, as high as 168 or 170. Occasionall
and in a case that occurred to one of us, i
96 on the second day, and only 88 on the th
good deal of rash upon the skin. The skin
general rule, and loses its usual softness and
of the face is usually natural. The eye is
injected. The respiration is generally easy
times when the fever is violent it becomes q
and percussion signs are natural, unless som
is often a rather frequent cough, which is dr
the guttural inflammation, and not on any
tion; it exists during the early period of the

ie, and its whole surface assumes a deep red tint and a shining ap-
nce, which makes it look like raw flesh. At the same time it is often
diminished in size from contraction of its tissues, and its papillæ
ne enlarged and projecting; this condition generally lasts from six
n days, after which it returns to its natural state; it is commonly
throughout the attack. Vomiting is rarely troublesome in mild
, though it often occurs; the bowels continue nearly in their natural
ition; in some few cases slight diarrhœa occurs, but more frequently
is very moderate constipation, which requires the use of mild lax-
s. The abdomen is natural in most of the cases; sometimes, how-
there is slight distension and pain for a few days, which coincide
rally with enlargement of the liver, or more rarely of the spleen.

ie urine during this stage usually presents the ordinary febrile char-
s; it is diminished in quantity, often of high color, though the pig-
is not necessarily increased. The urea is not increased, which
er regards as indicating that the kidneys are affected from the begin-
of the attack. The chlorides are always more or less diminished.
phosphoric acid, according to Dr. Gee, is about normal for the first
or four days; it then diminishes, and remains for a few days at a
or a third of its normal amount. Uric acid appears to be retained
g the pyrexia, and excreted in excess so soon as it begins to sub-
According to Holder's examination of 17 cases, there is bile pig-
present during the first six days.

rly in the second, or even in the first stage, the fauces present the
of inflammatory action; the pharynx is reddened, and in some in-
es swelled; the tonsils enlarge and become red; the submaxillary
ymphatic glands are somewhat tumefied and tender to the touch,
hen the case is at all severe, deglutition is generally painful, and in
instances extremely so. The absence of complaints of sore throat
child, or the fact of its swallowing without hesitation or apparent
ulty, is no proof that angina does not exist, since we have always
l upon examination in a good light much greater redness than natu-
nd in many instances redness and swelling combined. As the erup-
progresses, and the tongue loses its coat and becomes red, the inflam-
on of the pharynx usually augments; the redness becomes deeper,
the tonsils are more swelled and painful, and in a good many, but
by any means all the cases, dotted over with small white spots, or
thin, whitish, and soft false membranes. The throat-affection, how-
, is rarely severe enough to constitute a serious danger in mild scar-
a, while in many of the malignant cases it is a frequent cause of a
termination. During the eruption, the nostrils are either dry and
isted, or there is some coryza. The strength of the child is reduced
he time, but there are no signs of prostration, and the decubitus is
ferent. There is almost always more or less disorder of the nervous
m, sometimes amounting only to headache and restlessness, while
her instances there is great irritability, wakefulness, and occasional
ium, especially at night.

*age of Decline and Desquamation.*—The eruption reaches its height,

its frequency, and falls to the natural stan
first subsides and then disappears, but the s
the redness and swelling of the tonsils and
of false membrane, if these be present, are
deglutition becomes easy if it have been d
throat-affection vanish; the tongue cleans off,
and after a time returns to its natural state.

At the time that the subsidence of all the
*quamation* begins. It dates, therefore, in mo
day, though it may be either earlier or later.
date of commencement varies from the sixth
commences in most of the cases on the face a
stances it appears first on the abdomen. It
the body and becomes general. About the th
in the form of minute points, like those which
of sudamina; on the face it is in the form of
while on the extremities large flakes of the e
from the derm, and are removed by the child,
ments in bed; these flakes are sometimes so
as to form complete moulds of the fingers and
and feet. The whole process usually occupie
but may be prolonged into the third week, or
second month. It is generally accompanied
and some itching and irritation of the skin.
face beneath the exfoliation is left tender a
afterwards.

During this period, dating from the sixth o
comes abundant, pale, of neutral or faintly ac
to Gee, deficient in phosphoric acid.

Albuminuria is also frequently observed d
much more so than during the eruptive stag

emperature remained at the same point throughout the day in the
severe attacks; in slighter ones, it fell in the morning and rose during
lay, being most frequently at its highest point between 2 and 8 P.M.
n the morning remission was marked, it indicated the approach of a
rable termination. The first decided fall of temperature, coinciding
a diminution in the eruption, occurred in the majority of cases on
fifth day, or if not on this day, it usually was deferred until the tenth
fteenth. In these latter cases, however, a fall of varying extent had
irred on the preceding fifth days. After the marked fall on the fifth,
h, or fifteenth day, the temperature remains from 99° to 101° for a
able time, coinciding when persistent, with continuance of the angina,
ome one of the other lesions of the disease. If at any time after the
plete fall of the temperature, there is any considerable elevation
in, it indicates the development of some sequel, either an affection of
kidneys, throat, or one of the serous membranes. It is thus seen that
temperature in scarlatina tends to form arcs or cycles, usually of five
s' duration.

efore quitting this part of our subject, we must remark that, though
above is a correct description of the usual symptoms of mild cases
this disease, the reader would be greatly deceived should he expect
ays, and invariably, to find this exact train of morbid phenomena.
the contrary, the mild and the grave cases both vary so much, that it
mpossible to describe them accurately by one or two portraits. Taking
above sketch as a standard of the mild cases, the observer will find
t many fall short of it in all their features, while others deepen gradu-
in their shades, so to speak, until they pass into the grave type.
ose that are milder in their type than the above sketch, may be so in
h a degree as to make it very difficult, and in some cases impossible,
determine positively whether the child has had the disease or not. In-
ed, we doubt not ourselves that children sometimes have the disease so
ghtly, that it is not discovered by either the physician or parents, and,
ng protected by the attack, are in after-life classed amongst those in-
ceptible to the disease. Our grounds for asserting this are the facts
t some cases we have seen have been so very mild that, but for the
stence of the disease amongst other members of the family, they might
e passed unobserved; and that in one instance we were sent for to see
atient, who had had the eruption for three days, and yet who was so
ghtly sick that he was sent for from school, to which he had gone, for
to see. It was a well-marked case, and the child had no troublesome
nptoms afterwards, notwithstanding the exposure he had undergone.

*rave cases.*—The following description of the symptoms of grave cases
scarlet fever is, like that which has just been given of the mild cases,
wn partly from books, and partly from our own observation of the dis-
e. Our own experience includes the careful observation, and a more
less full notation, of 57 grave cases. We shall include under this di-
ion of the subject, as already stated, most of the cases usually classed
writers under the title of scarlatina anginosa, and all those generally
cribed under the title of scarlatina maligna.

may be much milder, more like those which marl
cases, but even under these circumstances they s
and dangerous character.

The first set of cases, or those in which the sym
vere of all, and which include most of the malignant
ataxic, usually begin with nervous symptoms. T
stantaneous. In one, the little patient, a girl two
ther and sister had been sick for some days with
bed in the evening in her usual health, which wa
She slept quietly through the night, but was found
morning in a state of drowsiness, violent fever, an
red scarlatinous rash. She soon became comatose
day. In another case, a boy eleven months old w
afternoon, but was put to bed in the evening as us
About ten o'clock the nurse heard a rustling in th
it, found him in a violent general convulsion. Th
covered with a scarlet rash, which became deeper an
went on. On the second day he was nearly insens
attacks of convulsions; on the third day he had
with spasmodic twitchings, and at the end of that
coma. In a third case, a boy six years old, whos
for a week with a mild attack, went to bed well.
morning, he was seized with vomiting and purging
of the skin, and great exhaustion. At nine o'clo
dull, the skin was pale and cool, and the pulse extre
ing and purging had ceased; at 12 M. he was coma
sion. From this time he continued comatose unti
the same day, after an illness of fifteen hours. In
invasion was that of croup; after a few hours cam
sions; patches of eruption then appeared on the tru

nt hydrocephalic cries, which condition lasted ten days. After this
e was diarrhœa, extreme emaciation, loss of speech, and entire deaf-
. Gradually, however, the fever disappeared, the tongue cleaned off,
intelligence very slowly returned; in the sixth week convalescence
firmly established, and the child recovered perfectly with the excep-
of his hearing, which remained very dull in consequence of the per-
tion of both membranæ tympanorum. In a seventh, a girl eight years
whose brother was then sick in the house with the disease, was in the
ning well. At breakfast she said she felt sick and soon went to bed.
5 P.M. of that day, she was attacked with a general convulsion which
ed about fifteen minutes. The pulse, immediately after the convulsion,
150. At 11 P.M. she had another convulsion. Through that night,
was very restless and wandering. On the morning of the second day,
re was a third convulsion, which, however, was very short. The pulse
now 160, small, and feeble. The patient was very heavy and dull,
wering questions slowly, and with great difficulty, and during part of
day she was comatose. On the third day, she was better, the pulse
ing fallen to 152, and she was less dull, though she still continued very
vy and inattentive unless aroused by persevering efforts. The limbs
e cool, while the head and trunk were hot. The eruption was thick
the trunk and upper part of the extremities; elsewhere it was scanty.
erever it existed, it was of a deep red or purplish color, and the capil-
y circulation was sluggish and imperfect. On the fourth day, her in-
ectual condition continued better, but the extremities were still cold,
d the lymphatic glands and subcutaneous tissues about the lower jaw
d neck had begun to swell. On the fifth day, the swelling had become
y great; the stupor had returned; a profuse and disgusting coryza and
rrhœa had set in; and the edges of the eyelids were inflamed and sore.
the sixth day the discharges from the mucous membranes of the head
re very copious, and consisted of a thick, offensive, purulent fluid, in-
mixed with dull whitish grumous particles. The patient was now
matose or very restless; she swallowed with great difficulty; the swell-
g under the lower jaw and about the throat was enormous; the pulse
s rapid and small; the eruption was very dark in tint; the cutaneous
culation was slow; the extremities were cold, and death occurred about
middle of this day. In another case, the subject of which was a girl
tween three and four years old, the attack began with severe inflamma-
n of the throat, causing great difficulty in swallowing. The rash on
first day was very extensive and of a deep red color. The child was
owsy and heavy, or else delirious. On the second day, she was coma-
se, and had strabismus and automatic movements of the limbs. On the
ird day the coma continued, and there were automatic movements of
e extensor muscles, with retraction of the head. The eruption con-
ued vivid, but was of a dark red color. Death occurred in the middle
the fourth day, in a state of coma, without convulsions. In still another
se, a boy, between eight and nine years old, was attacked suddenly,
ile in good health, with vomiting, sore throat, and high fever. Twelve
urs after the onset, he had a severe convulsion, which lasted fifteen

continued drowsy and heavy. The eruption ca
The fauces were very much inflamed and som
external lymphatic glands were enlarged, but sti
difficult. On the fifth day he was not so well,
heavy alternately. There had now come on mu
and some croupal sound. The latter symptom i
until the dyspnœa became very great. Deglut
sively difficult; the external swelling increase
attended with the most painful and distressing
were renewed more and more frequently; and de
about the middle of the sixth day. In a tenth
old, convulsions occurred on the second day.
coma lasting several days, and by enormous s
glands and subcutaneous tissues on the left si
less degree of swelling on the right side of the
sides suppurated and were opened, and the ch
fectly. In an eleventh case, in a boy seven years
convulsions took place on the third day, after w
and coma alternately for several days, with cor
otorrhœa, lasting in all six weeks. The child
deaf.

In this form of the disease, therefore, the sy
virulent character. The onset is sudden. The
hours from a state of apparent health, into one
Most of the cases begin with violent fever, and
strength. The pulse soon becomes very rapid
quent that it cannot be counted, and it is at the
irregular. The skin is dry and burning hot in
or even cold. There is generally nausea or vo
violent and constant. These are accompanied i
experience, only in the severest of all, by

d, to be more promising, and very often both the physician and
ls are greatly elated by the improvement in the patient's condition.
re these hopes always illusory, since children do recover occasion-
ven in cases that have exhibited the most threatening and malignant
arance at the moment of invasion. It happens, unfortunately, how-
in a majority of such attacks, that the improvement which takes
on the third or fourth day is only momentary. The nervous symp-
subside, but new phenomena make their appearance in the shape of
e inflammation of, membranous deposit upon, or ulceration of, the
es, and extensive swelling and induration of the lymphatic glands
subcutaneous tissues about the angles of the inferior jaw, and under
chin and throat. In connection with the throat-affection which de-
ps itself in this way, it is very common to have abundant purulent
za, and often also otorrhœa. The symptoms assume, in fact, the
ures of the cases usually described under the title of scarlatina an-
sa. As we shall, however, describe them directly in our account
he second set of grave cases, it is unnecessary to pursue the descrip-
at the present moment. We will state, however, before proceeding
her, that the anginose and general symptoms which occur in cases
inning with violent nervous phenomena, and especially with convul-
s, are nearly always of the most dangerous and malignant character,
usually end fatally in two, three, or four days after their appearance.
he eruption in this class of cases varies according to the violence of
attack. In the severest one that we saw, that which proved fatal in
en hours, no eruption whatever was perceived, and we only knew it
e scarlatina by the character of the other symptoms, and by the fact
t the sister of the boy had been sick in the same house with the dis-
e for a week. In the case which terminated in twenty-four hours, the
ption showed itself in the form of scarlet patches about the face and
per parts of the body, twelve hours after the onset. In a third case
eruption was moderate, but perfectly well marked and general. In
other thirteen cases, which lasted, with one exception, not less than
ee days, the eruption was perfectly well marked. It covered the whole
face, was at first scarlet in color, soon ran into a deep red, and then
ame violet or purplish. The exceptional case was one which lasted
rty-six hours, and proved fatal in that time. In this also, the eruption
s well marked and extensive. M. Gueretin (*Arch. de Méd.*, t. i, p. 292,
2), in his account of the acute malignant form which he witnessed,
tes that the eruption was nearly constant. In all our cases it occurred
hin twenty-four hours from the invasion, while in those of M. Gueretin,
ppeared within twenty-four or forty-eight hours, or, as more frequently
ppened, not until the fourth or fifth day.

If no favorable change takes place in these severe cases, and when
y do not prove fatal at once, the patient grows weaker and weaker;
delirium continues, or is replaced by coma; subsultus tendinum,
idity of the limbs, spasmodic twitchings or general convulsions, make
ir appearance; the eruption becomes more and more livid; the pulse
ws smaller, more frequent, and irregular; the respiration is exces-

sively embarrassed; deglutition becomes impossible: and the p in from three to seven or nine days. In some few instances struggles on for several weeks, and dies in a state of utter or, having a constitution of great powers of endurance, at last the disease and recovers.

The invasion of grave cases is not always, as we have stat violent as in those which have just been described. In rather two-thirds (41) of the 57 grave cases that we have seen, the less threatening than in the other third, though the symptoms and dangerous in most of these also, and when not so at the very soon assumed the serious characters which make it neces the cases in which they occurred as grave. The chief differe the symptoms that mark the onset of grave cases of this k those in which the symptoms are still more violent, which latter thus far been describing, lies in the character of the nervous —in the latter most severe, threatening, and dangerous, stupor, coma, or convulsions, and in the former, merely excessive restlessness, heaviness, or stupor. In one well-marked case now under consideration, the patient, a boy between seven years old, was attacked in the evening with headache, fever, and On the following morning a faint rash was perceptible, which noon of that day, was distinct, though not very full. The case idly assumed unpleasant features. The pulse rose to 150. much drowsiness and delirium, and on the fourth day const at the bed-clothes and at the fingers. In another case, in a four and five years old, the first sign of sickness was slight dinner, which was followed by fever in the evening, and the de in the course of the night of a scarlatinous rash. On the f there was some pain in the throat, with redness; the pulse was the skin hot and dry; there were no nervous symptoms, ex drowsiness. On the third day the pulse was 136, the rash was and there were no unpleasant symptoms whatever. From this ever, the symptoms gradually grew worse; the throat-affection the cervical lymphatic glands becoming very much swelled, an growing more uneasy and restless, though retaining perfectly gence. By the sixth day, the grave character of the case was veloped, the eruption being intense, and of a deep brick-re towards a purple color. There was at the same time very g ness, abundant discharges from the nasal passages of thick and purulent fluids, membranous exudation in the fauces, w and great difficulty in swallowing, and an utter loss of ap third case, a boy between one and two years old was a little fr morning, and was seized in the evening with vomiting and very considerable restlessness. On the next day he was cov scarlet rash from head to foot, and the skin was fiery hot. T 160, regular, not large. The child was very drowsy, dozing the time, but quite intelligent when aroused. The fauces were red and rough, and the tonsils much swelled; there was very

welling. On the third day he was still very drowsy, and, when roused,
observant than before, though he still recognized persons. The
e was 168, small, difficult to count, very hard, and corded. The skin,
cially that of the limbs, was scarlet, very hot, and dry; the cutaneous
llary circulation was good. After this the symptoms grew rapidly
se; the pulse continued at from 148 to 168 on the fourth and fifth
s, and on the sixth rose to 172, at which it stood a few hours before
h. On the fourth and fifth days, he was still very heavy and drowsy,
so much so on the former as to take no notice whatever except when
ed. On the fifth day, an abundant sero-mucous discharge took place
the nostrils; the cervical lymphatic glands, which had begun to
ll before, now increased in size; there was some loud faucial gurgling,
the swallowing became difficult. On the morning of the sixth day,
e of the symptoms improved so much as to flatter very greatly some
is attendants, who were unacquainted with the treacherous character
he disease. He roused up from his state of stupor, and noticed sev-
things that were shown him, even taking them into his hand; but
breathing continued bad, the lymphatic glands were swelling rapidly,
had already become very large, so that they formed great projections
either side of the neck. The pulse was 155, and small. In the mid-
of the day the breathing became difficult, from the internal and ex-
al swelling, and from the collection in the fauces of thick and viscid
egm. The surface had now become pale. The tumefaction about the
k was immense. Down the front of the neck and along its sides to
clavicles, a kind of œdematous swelling of great size had come on,
was rapidly increasing. The pulse was 160, small, and feeble. The
s and arms were of a dark, congested tint. Deglutition was exces-
ely difficult. In the evening the pulse was 172, and death took place
before midnight with slight convulsive movements.

he mode of invasion is different, therefore, in different examples of
kind of grave cases now under consideration. In some it is even
der than in any of those that have just been detailed; and it is not
il the third, fourth, or fifth day, or even later, that the severity of the
ck shows itself fully and unmistakably.

fter the disease is once established, it will be found upon examina-
, that the fauces are of a deeper red color, and that they are more
lled, than in mild cases. At the same time there is more difficulty
pain in deglutition; these are complained of by older children, and
shown in those who are younger by their refusal to swallow, by their
ing upon making the attempt, and in some instances, especially at a
r period of the sickness, by a positive inability to perform the move-
nt. In nearly all of these cases, false membrane is formed upon the
cous membrane of the throat. This is never, or very rarely, present
the first day of the attack. In most cases it is not found until the
ond or third, and often not before the fifth or sixth day. MM. Rilliet
Barthez state that they have known it not to appear until the tenth
eleventh days. It appears first in small, thin, whitish, yellowish, or
-colored points or patches, on one or both tonsils, or on the soft

four days, or more, and are then detache
which they are seated is found in various
redness and swelling indicative of severe
ened, ulcerated, and, according to MM. G
though, as a general rule, what have bee
fact portions of altered false membrane.
the breath, sometimes amounting to a ga
ance of the pseudo-membrane. The sev
portion to the extent and thickness of th

We have already seen that it is not u
neath the false membranes. In other cas
tion assumes very great violence without
whatever. In some the mucous membran
plish hue, its consistence is softened, and
layer of grayish or sanious pus. The tons
pus, softened, and break down easily und
in addition to the redness and softening,
may be superficial, amounting only to erosi
the mucous, and even submucous tissue,
are seated generally in the pharynx, but
and in some rare cases they extend into th
nant attacks of the disease, we find evidenc
It is important to distinguish between th
brane becomes so changed as to assume t
those in which the tissues of the pharyn
former constitute by far the greater numbe
generally regarded as instances of gangr
grene of these tissues does actually occur
however, by the evidence of Dr. Tweedie,
in malignant scarlatina "the membrane of

of the mouth, and by the pressure exerted on the internal parts roat, to add to the difficulty of deglutition which already exists. cases the pressure is so considerable as to embarrass the respi- f the child. This swelling has been generally supposed to depend mmation of the parotid glands; but MM. Bretonneau, Guersant .che, and Rilliet and Barthez, all state that parotitis is of exceed- re occurrence, and that the swelling in question depends nearly on the causes just described. The last-named writers state, more- at the tumefaction of the cellular tissue is often of the nature of œdema. The swelling of the cervical lymphatic glands, and of the tissue of the sides of the neck, and that under the throat and chin, takes place to any considerable extent, according to our experience, o the third or fourth day. During the first two or three days, the ymptoms are the fever, the eruption, and the nervous phenomena, latter consist, in this class of cases, of either excessive agitation stlessness, or of drowsiness or stupor. Very often, after a child has d to be very ill for two, three, or four days, from the violence of the reaction and the severity of the nervous symptoms, it will appear rove very decidedly on the third or fourth day, and elevate greatly pes of those interested in it. It is just at this time, however, that roat-affection is apt to set in severely; and, moreover, it rarely fails e in children who have presented violent symptoms during the first days. The enlargement generally disappears, in favorable cases, m three to twelve days, by resolution, while in others it terminates ppuration of the glands and surrounding parts.

the form of the disease we are now considering, it is common to e violent *coryza*, which may be either purulent or pseudo-membra- It may appear from the very first, or not for several days after uption has commenced. The discharge is yellowish, granular, thin, offensive, and highly acrid, so as to excoriate very much the upper It often flows in surprising quantities, and generally continues up moment of death, or until all the symptoms have moderated.

*rrhœa* is another symptom of this form. It generally occurs simul- usly with coryza. The discharge is at first thin and watery, like from the nostrils, but becomes gradually thicker as the case ad- s. The quantity is extremely variable. In some cases we have n it to fill the meatus and concha of each ear, and then to flow out nake large stains upon the pillow, or to collect very rapidly after wiped away. It is, like the coryza, an unfavorable symptom, as a mark of the grave form of the disease, and because, if the child ers, it is very apt to result in deafness, which is but too often per- nt.

ese symptoms, coryza and otorrhœa, sometimes exist also in mild , but they do not then assume the peculiar characters which they nt in grave cases. The discharges are much less abundant, and the s or pus is healthy, and scarcely offensive to the smell; they last but rt time, and are very rarely accompanied at the time or followed by than a slight degree of deafness.

seventh day, when it appeared in patches on the wı the eighth day it extended to the rest of the extreı and on the ninth was general and of a rather dark exceptional case the eruption did not appear until then came out over the whole trunk, and to a mode limbs also. In this, as in the previous one, it was three other cases it was quite moderate in amount, marked.

The *general symptoms* are more severe in grave th sometimes happens that for one or two days, or e promises to be mild, but then suddenly assumes the of the form under consideration. The fever is usua being full and strong, and rising very soon after the 170; the skin is very hot and dry; there is more re bility than in the mild form, and after one, two, or t strong disposition to delirium and stupor, not unfre coma. The respiration is accelerated, and in many the throat-affection, labored and difficult. In most gurgling, which is very characteristic, is heard in the when the child is asleep or dozing. This depends i lection of viscid and tenacious secretions in the fauce embarrass the respiration so much as to make it them with a mop, or by the operation of an emetic, the existence of the coryza of which we have spoke symptom of very serious consequence at all ages, but children. There is generally some cough, which n troublesome, though not usually so unless there be a geal complication. The voice is hoarse, guttural, a pering. When the cough is very frequent, and still mo hoarse and croupal, in connection with hoarse or v ek, and at last, after an illness of four, five, or six weeks, the child r dies or recovers after all chances for life seem to have been lost.

order to show, in their natural connection, the different symptoms have just been described, we will cite the following abstract of three ır cases. The first occurred in a boy between seven and eight years On the fourth day of the attack the pulse was at 150, and the fauces ented flakes of false membrane. The fauces were very much swelled, deglutition became difficult; faucial gurgling came on, and the throat filled with viscid and tenacious secretions. The nasal passages now me occluded by constant discharges, at first mucous and then mucolent, with admixture of membranous particles. From the fifth to the h day there was an excessive fetor from the nose and mouth. The phatic ganglions just beneath the ear swelled very greatly, so as to nd much beyond the line of the inferior maxilla. The tongue and became dry and cracked, the teeth were covered with sordes, and the les of the eyelids inflamed and then ulcerated. On the sixth, seventh, th, and ninth days, there were taken away from the mouth and throat he child, with a mop, hard and most offensive masses of dried-up mu- and incrusted epithelium, enveloped in thick, gluey, dark-colored cus. These masses stuck to the fauces, tongue, and lips, so tenaciously, t they could be removed only by means of a mop, the boy himself being te unable to detach them. On the seventh, eighth, and ninth days, ugh the cervical lymphatic glands were very much swelled, the patient s better. The pulse came down gradually from 152 to 132, 128 and , and the swallowing improved so much that the child could take ids with less convulsive effort, and could drink continuously. The wsiness diminished, and the delirium ceased. On the eighth day a ght erythematous redness appeared on the bridge of the nose, and exded towards the malar bones. The skin of the face and eyelids became newhat swollen and puffed by an œdematous effusion. On the ninth the pulse was down to 104, and the skin was nearly natural as to perature. The swelling was very great on both sides of the neck, and glands on the right side were red on the surface, very hard, and quite nful. The swallowing was much easier for drinks, but as yet no solid, even of the softest kind, could be taken. On the fourteenth day from onset we opened a very large abscess on the left side of the neck, ich discharged abundantly a healthy and laudable pus. On the fifnth day we opened a still larger abscess on the right side, and after s perfect recovery took place.

n another example, which has been alluded to already, occurring in a between four and five years old, the gravity of the case did not show lf clearly until the sixth day. On the evening of that day the pulse s 128, the skin very hot and dry, and there was an intense eruption of rick-red color. There was, at the same time, great drowsiness, and er loss of appetite. Deglutition was difficult, and there was a loud cial gurgling during sleep. There was now also a considerable amount membranous exudation in the fauces. During the seventh and eighth s, the boy continued very sick. He was drowsy, almost comatose;

the eyes were half open and the conjunctiva minutely inje an abundant coryza, the discharges being composed of and sero-mucous fluid, with an admixture of pus and of grumous particles, the latter consisting evidently of bro branous exudation. There was no otorrhœa. The pulse to 128. During the night of the seventh day the anginose so severe that the child could swallow nothing from 10 fluids poured into the mouth ran out again in part, and we turned through the nostrils. On the tenth day there was st improvement, except that the pulse had fallen to 112. Th tinued as before: the fauces were covered thickly with whit the deglutition was a little easier. The drowsiness con child dozed nearly all the time, merely rousing from time to drinks, and then, in spite of all solicitation, sinking into The abdomen was tympanitic. The urine was rather free, it had been before, and it was also clearer and of a lighter co twelfth day there was a decided improvement; the pulse had f and the child was not quite so heavy. The act of swallowing and the fauces showed less of the plastic exudation, but th very much coated with tenacious mucus. On the thirteen teenth days the patient continued to mend. The pulse fell t the fauces had become clear of the exudation, and presente excoriated and ulcerated appearance. The secretions into the less viscid and less copious. The coryza had diminished, a charges had become first muco-purulent and then mucous. T ness had diminished, so that he waked spontaneously and for his toys. He now began to demand food, but refused things were brought to him. On the fifteenth day he was irritable, screaming most violently for the slightest causes. teenth day the pulse was 92, and the skin nearly natural as ture. He was now exceedingly emaciated and very weak. T of the nasal passages were very much irritated and incruste was scarcely any coryza. The tongue was clean, pink in color, the thirst not too great, and there was a little appetite. The improving. From this time forward the child improved slowly, so that he sat up for the first time on the twenty-sev was as much emaciated at that time as after violent typhoid

The reader must not, however, suppose that all grave ca throughout their whole course, symptoms as dangerous as marked the two examples that have just been detailed. In contrary, the symptoms, though of such a character as to de quire the title of grave, are of a much milder kind. In or this part of our description of the disease as clear as may relate the following as an example of a grave case in which the though severe, were neither malignant, nor at any one time ous to life. A girl between seven and eight years old was we fast. In the course of the morning she complained of sore of not feeling well, and at 4 P.M., when we saw her, was quite a frequent pulse and hot skin, and showed already a well-marked rather faint scarlet rash upon the trunk of the body, and about the ws. On the following day the trunk and upper parts of the limbs covered thickly with an intense eruption, of a bright scarlet color. fauces were very red, somewhat roughened, and a good deal swelled. only nervous symptom present was severe frontal headache. There no unusual agitation, no drowsiness, and nothing like convulsive ement. On the evening of this day, the pulse had run up to 168, and as rather full, but not hard. The skin was exceedingly hot and burn- during the night there was great restlessness, and the child was eful and occasionally delirious. On the third day the symptoms con- ed much the same, except that the pulse was down in the morning 52, that the rash had extended to the hands and feet, and that some ll spots of whitish exudation were now visible on each tonsil. On the t of this day the fever again increased very much, and the child was n delirious. On the fourth day the pulse was 148; the exudation had eased so much as to cover a good portion of both tonsils, and it had nded also in a slight degree to the posterior wall of the pharynx. re was now a considerable enlargement of the lymphatic glands situ- at the angle of the jaw on the left side, and a smaller one on the t side. Deglutition was somewhat painful, and a little difficult, but seriously so. The case continued in much the same way until the nth day, when the pulse had fallen to 132, and the eruption had faded much on the trunk of the body, and to a considerable extent, upon limbs also. The fauces now exhibited the false membrane over the e of both tonsils, over the half-arches, the sides of the uvula, and the upper portion of the posterior wall of the pharynx. Instead of g whitish and clean-looking as at first, however, the false membranes looked exactly like sloughing portions of the mucous membrane. y were of a dirty brown color, softened, and seemed to be detaching mselves like sloughs from the tissues beneath. On the ninth day the ient was much better, the pulse having fallen to 116; the eruption had ost wholly disappeared; the heat of skin was very much reduced; the k-colored portions of false membrane had disappeared from the fauces, ving the mucous membrane beneath red, excoriated, and in parts erated. On the thirteenth day, the child was convalescent, the pulse ving fallen to 96, the heat of skin having disappeared, and the throat ing nearly well. The appetite had returned, the temper was serene d cheerful, and the patient was, in fact, well, with the exception of akness, and some remaining soreness of the throat.

*Laryngitis* has been supposed by some persons to be of frequent occur- nce in the course of the disease, while others assert that it rarely, if er, occurs. M. Bretonneau has never met with it. M. Rayer says he es not know that the exudation has ever been found in the larynx or achea. Tweedie (*Cyclop. Pract. Med.*, Art. Scarlatina, p. 640) states at in the dissections he has made he has not seen an instance of the embranous exudation extending into the larynx. That it does some- nes occur, is proved nevertheless, beyond a doubt, by the evidence of

MM. Guersant and Blache, Rilliet and Barthez, and others, a own observation. MM. Rilliet and Barthez report three ca it was found in the larynx after death. These gentlemen st that they have never observed the peculiar symptoms of cr does not accord with our own experience: for in several ca have seen, all the peculiar symptoms of that malady were pr life. The subject of one of these cases was a boy two years of a days after the invasion of the disease, a severe and extensive p branous angina was developed. This was soon followed by s toms of croup,—hoarse cough, stridulous respiration, weak. dyspnœa, and whispering voice, which lasted about five days angina and croupal symptoms both diminished very much, a seemed in a fair way to recover: suddenly, however, extensi tion of one side of the neck took place, and he died in twenty- Unfortunately no examination could be made. In another child between six and seven years old, who had a most violent the disease, severe croupal symptoms set in on the eighth consisted of harsh, croupal cough, stridulous respiration, and culty in swallowing, and the act of swallowing occasioned cough and strangling. The symptoms continued on the ninth which they moderated, and the child finally recovered enti third case, also a violent one, in a boy between eight and nine and in which general convulsions occurred on the first and se the symptoms had improved a good deal on the third and On the fifth day, he was not so well, being more restless and having much difficulty in breathing, with some croupiness These symptoms increased rapidly until they gave rise to m fits of suffocation, and caused a fatal termination on the sixth fourth case, in a child nine months old, death occurred on th day from laryngitis, occurring in connection with membran The fatal termination was preceded by hard, dry, and croup stridulous respiration, and great difficulty of deglutition. In a child under a year old, croupal symptoms made their appeara sixth day, the fauces being at that time covered with membran tion, and they caused or assisted to cause a fatal terminati eighth day. In yet another case, the subject of which was be and two years old, a grave attack of scarlet fever was entirely from. At the end of the second week the child was seized, ow proper exposure in a cold house, against which the parents properly warned, with anasarca. This also was recovered again the parents were warned against improper exposure. On day after our last visit, however, the child was taken down sta room with the windows open, and this on a mild day in the February. The child was seized now with diphtheritic angina after a few days, of croup. This was in the fourth week from of the scarlet fever. In a seventh case, severe from the beginn patient recovered so as to be apparently out of danger, but, owi room being very cold from the fact that it was large with wide

ows down to the floor, and from the fire being too small, the child
old, and, at the end of the third week, was seized with severe croup,
had many of the features of membranous croup, but which was, in
obability, spasmodic croup, dependent on ulcerative laryngitis. The
continued seven days, during which time the patient was violently
t finally, after a most dangerous struggle, it ended favorably.

e symptoms which indicate a disposition to implication of the larynx
equent, hoarse, and croupal cough, hoarse and whispering voice or
phonia, and dyspnœa with stridulous respiration.

e *duration* of grave cases of scarlet fever is very uncertain. In some
isease runs its course with frightful rapidity, destroying life within
hours or days. In others, though the symptoms of the early stage
seem to be as violent as in those where death occurs in a very short
e of time, the patient either lingers for several days or two or three
s, and then dies, worn out by the violence or malignancy of the at-
, or else, after a most dangerous and apparently desperate illness, he
ly struggles through and recovers.

the most violent of the grave cases, those which we described first
rming a separate group, 16 in number, of which 11 proved fatal, the
tion in the fatal cases was between eighteen hours and six days. Of
1, 1 proved fatal in eighteen hours, 1 in twenty-four hours, 1 in
y-six hours, 4 in three days, 1 in four days, 1 in five days, and 2 in
ays. Of the 5 favorable cases, 1 lasted three weeks, 1 four weeks, 2
eeks, and 1 two months.

the less violent of the grave cases, 41 in number, 14 died, and 27 re-
red. Of the 14 fatal cases, 1 died in four days, 2 in five days, 2 in
days, 3 in eight days, 1 in thirteen days, 1 in fourteen days, 1 in
n days, 2 in four weeks, and 1 in five weeks. Of the 27 favorable
, the duration of the shortest was seven days. The remainder lasted
twelve days to six weeks, the most common period being between
and four weeks.

MPLICATIONS AND SEQUELÆ.—*Dropsy.*—This is one of the most fre-
t and important sequelæ of the disease. We have already remarked
in a considerable proportion of cases, the exact number apparently
ing somewhat in different epidemics, the urine becomes albuminous
ng the stage of desquamation. This, however, is usually transitory,
probably depends partly on the condition of the blood itself, and
tly on renal congestion. But in some cases, owing to one of the
ses to be mentioned hereafter, the albuminuria persists, or if it has
been present or has disappeared, again makes its appearance; and
symptoms of acute nephritis develop themselves. Among these the
st striking one is dropsy, and, indeed, so prominent is it, as to have
e attracted attention for a long time, and only to have been of late
ciated with a lesion of the kidneys.

ertainly, in the vast majority of cases, when dropsy appears as a sequel
carlatina, the urine will be found to present all the characters present
cute Bright's disease; and yet there are some high authorities (Simon,
querel, Philippe, Rayer) who assert that marked dropsy may occur

ferent epidemics and in different forms of sca
fifth of the cases of MM. Rilliet and Barthez,
in about a ninth, of those observed by ourse
in the course of the second or third week of
the process of desquamation. It is thought to
severity much more frequently than those of
Tweedie states that it has never been observe
attack. This does not, however, accord with c
of the 29 examples that we have seen, 6 occur
disease. Still it may be said on the whole, that
disease bears an inverse proportion to the activi
ment of the symptoms of scarlatina. The effusi
the cavities or the cellular tissue of the body, or a
mon form in which it appears is anasarca, after
are, in the order in which they are mentioned, œ
thorax, ascites, and hydropericardium.

The *exciting cause* of the dropsy is generally 
tracted usually by exposure to air and moistur
We have rarely known it to occur when the pati
the chamber or house until after the twenty-first
hand, we have seen it follow immediately upon a
the fourteenth day, the child having apparentl
several days before. We have known it to occur
been allowed to run through the house exposed
doors and windows.

We have been able, in a number of instances,
obviously to cold. Thus, in one very marked e
six and seven years old had had a mild attack 
so entirely recovered that we ceased our visits 
ing strict injunctions with the mother as to the

day, anasarcous. In another instance, anasarca was produced at nd of the third week, the child being quite well previously, by his taken into a cold room to sleep. We could cite other instances of me kind, but these are enough. It is sufficient to say that in a large ity of the cases that we have seen, it has manifestly and obviously ed improper exposure during the second or third week. In a few , however, it has come on without any imprudence whatever, and we been entirely unable to ascertain the cause.

r can it yet be asserted positively, that the action of cold will fre- ly cause dropsy unless the urine have been previously albuminous: ugh it is undoubted that when albuminuria is present, any imprudent sure will insure the occurrence of dropsy.

are in the habit now of always directing the mother or nurse to the patient confined to the chamber for four weeks from the onset e disease, or, if it be allowed to run through the house, to take care ve it well clothed, and to keep the windows and doors carefully d should the weather be cold or cloudy. This direction is one of ost important to be given in the course of the disease. It ought to sisted upon in all and every case, occurring in the cool season of the

e question was formerly much discussed, whether the condition of idney which accompanies scarlatinal dropsy was one of the forms nal disease known as Bright's disease. Dr. Johnson suggested it was a peculiar affection of these organs, characterized by a des- ation of the epithelium of the tubules, for which he proposed the of desquamative nephritis. Recent observations have, however, that there is in reality nothing specific in the lesion, but that it is ical with other cases of renal catarrh or tubal nephritis, to use the ent name bestowed by Dickinson, occurring from whatsoever cause. d, it may be said that in almost 75 per cent. of all cases of chronic disease in children, the cause of the affection has been scarlatina, he form of the lesion is that which we have above mentioned.

rious causes have been assigned for the frequent development of nephritis in the course of scarlatina. Thus it has been supposed he affection of the kidneys resulted from inaction of the skin, owing intense congestion which attends the eruption; but clinical ex- ce shows that it is precisely in the cases where the affection of the s most intense that the kidneys are least disposed to disease. It rather appear that when the action of the virus is not fully deter- to the surface, there is violent congestion of the kidneys estab- , which, especially when the patient is exposed to the action of may result in the development of tubal nephritis.

*rbid Anatomy of the Kidneys.*—When death occurs in the acute stage renal disease, the kidneys are found enlarged and very heavy. The e is smooth and injected; on section, the organ drips with blood; alpighian bodies are congested, and appear as red dots; and the ls of the cortex and cones are gorged with blood. The tubules are ded with granular epithelium, granular matter, or fibrinous plugs.

who had had a very mild attack of scarlet fever, was seiz towards the end of the third week, after it was supposed to b and after exposure to draughts of cold air in the lower r house, with vomiting, and shortly afterwards with convuls which terminated fatally in thirty-six hours. In another ca between thirteen and fourteen years old, who had had a m marked attack, and who had convalesced, and been out of b days, fever with slight headache, and diminution of the ur at the end of the second week. After two days of slight ai out any signs of anasarca, he suddenly, without any warni violent convulsions, which were repeated frequently, with l feet consciousness, for a few hours. After twelve hours he pletely comatose, with occasional convulsive seizures, and di of eight hours more.

According to Gee (*loc. cit.*), uræmic convulsions and com quent in the course of scarlatinal dropsy, nor are they of s port as in acute Bright's disease in the adult.

The symptoms which mark the occurrence of internal e depend of course upon the part attacked. In one case they of œdema of the lung, in another those of hydrothorax, and those of hydropericardium or ascites.

*Urine.*—The particular condition of the urinary function described. It has already been stated that the amount of is less than natural during the early period of the dropsical a while this is true, it ought to be observed that the patient secretion more frequently than usual. There is in fact m symptom occasioned no doubt by the irritating character of which causes the bladder to contract and expel that fluid so a small quantity collects. The diminution in the amount of is usually a very marked symptom. It is sometimes almost tirely suppressed for a considerable period. In one case to one of ourselves, in a boy between one and two years old, discharge whatever for a period of thirty-six hours. During there was no distension of the bladder, as we ascertained careful palpation and percussion. In another case, which girl between three and four years old, and who was nursed by mother, one of the most accurate, reliable, and experienced city, we were assured that there was no discharge whatever five days in succession. During this suppression there was tion in the bladder. On the contrary, the hypogastric reg depressible, and sonorous on percussion. The patient was ve all this time. She was feverish and passed nearly the whole semi-comatose state, but could be roused with much effort, some intelligence; she rejected by vomiting almost everything given her, and complained when aroused of severe headache no convulsions nor any convulsive movements, and finally re the kidneys regained gradually their secretory function. In cases that have come under our observation, especially those seen in latter years, when we have watched this symptom more care- the diminution of the urine has been very great, so much so as to itute a most marked and reliable symptom.

mild cases, when the diminution is not very marked, the urine is of per color than natural, but retains its transparency when first voided. apt, however, to become turbid on cooling, and to deposit a more or abundant precipitate of urates. Its reaction is acid; its specific ity increased in proportion to the concentration; and urea and the ides are much diminished. Albumen is present, and microscopic ination shows epithelial or hyaline casts of the renal tubules, renal helium, and blood globules. In more severe cases, the urine is very h diminished in quantity, the color is either a very dark red, or has a kish or brownish tint, or is like smoke or soot; the specific gravity ry high; the amount of albumen large, and the precipitate contains y casts and blood globules, mixed with abundant urates.

he amounts of albumen and blood bear no definite relation to each r; in some cases, the albumen may be abundant without any blood g present; while in other cases, with a large precipitate of blood ules, the urine may contain but a slight trace of albumen.

asham calls attention to the occasional development of a bluish-green, subsequently greenish-black color, on the addition of nitric acid to heated urine, as a sign of very grave augury, being associated with nsive and advanced renal disease.

he duration of this stage of diminution of urine varies greatly in rent instances, and is to a certain extent indicative of the future gress of the case. It is succeeded by a stage in which the urine be- es abundant, even exceeding the normal amount, the specific gravity s, and the urea and chlorides return to the normal figure, but albu- is still present, the smoky color is apt to persist, and the precipitate ch forms on standing contains renal epithelium, blood globules, and ular or epithelial casts.

n favorable cases, the smokiness and albumen now gradually disappear, urine often continuing for a little while to be secreted in excessive ntity; but in other cases, and unfortunately they are but too frequent, albumen persists, and the urine assumes the characters indicative of nic Bright's disease.

he form which the dropsy takes varies greatly in different cases, seems to depend on inappreciable causes. Of the 29 cases that we e met with, anasarca alone was present in 22. In 1, there was exten- anasarca, hydrothorax of the right side, hydropericardium, and tes. In 5, grave cerebral symptoms, probably uræmic in character, e present; and in 4 of these anasarca also existed. In 1 there were hydrocephaloid symptoms, but of much less violent form.

ecent researches have established the fact that most of the cases nerly regarded as hydrocephalus are in reality due to the poisoned e of the blood, the so-called uræmia, so familiar to all, that it is merely essary to allude to it in this place.

he degree of danger to be apprehended from this dropsical complication

6 were fatal. Of the 22 cases in which the effusion but 1 was fatal. All of the 5 in which well-marked toms, due to uræmia, occurred in connection with a In one other case, which ended favorably, there w toms present. In the case above adverted to, i hydropericardium, and ascites were added to the recovered after a long and severe illness.

In addition to the cases of dropsy and uræmia just all occurred in our own practice, we have seen tw nous dropsy with uræmic symptoms in consultati on very suddenly in a young child, and proved fa while the other terminated favorably after a sever weeks. In the latter case, the patient, a girl, be years old, was in a semi-comatose state for a week irritability of the stomach, and complaints of head five days the urine was entirely suppressed, not a dr during all that time, at least with the knowledge o most accurate and competent person. In a third tion, the child died after ten days' violent illness, hydrothorax, and dropsy of the pericardium. La also seen in consultation, the patient, an infant in having had anasarca for a few days, became drows ing and heat of head, but recovered under the irritation over the back and diuretics. It would dangerous in the Parisian hospitals than in pri country, since MM. Guersant and Blache speak of fatal in twelve, fourteen, and thirty-six hours, afte even two or three months; and MM. Rilliet and often proving fatal.

*Diarrhœa* is not an uncommon accident in the ated with permanent deafness, necrosis of the temporal bone, facial y, and even abscess of the brain.

ccasionally during the desquamative period, a painful swelling of the ts appears, attended with a renewal of the fever and, frequently, with ating. This form of rheumatism is in all probability connected with imperfect excretion of some excrementitious substance, owing to the te of the various emunctories. In rather rare cases, the inflammation the joint runs on to fatal suppuration.

*Bronchitis and pneumonia* are rare. *Inflammation of the serous mem-nes* is more common, occasioning in some cases the dropsical effusions ich have already been treated of. It is in most cases connected either h renal disease or with the form of rheumatism above described. The ura is more frequently affected than any other of the serous membranes; d not rarely the effusion becomes purulent.

Inflammation of the investing or lining membrane of the heart also casionally occurs. Thus, of 39 cases of endo- or pericarditis mentioned Dr. West, 6 could be traced to an attack of scarlatina.

Peritonitis is much more rare, and the effusion here also is especially t to be purulent.

Scarlatina may be coincident with variola or measles. We have never en it in connection with the former, but in two cases which came under ir observation it was complicated with measles.

Diphtheria has also been observed not very rarely, usually appearing ring convalescence. In a considerable number of cases, scarlatina has en noticed in the course of typhoid fever.

In some rare cases, as in the one detailed under the head of prognosis, ore or less complete paralysis ensues during the convalescence from arlatina.

Tuberculosis is not nearly so apt to be developed after scarlatina as fter either rubeola or typhoid fever.

ANATOMICAL LESIONS.—The eruption sometimes disappears entirely fter death, and on other occasions assumes a deep livid or purple appear-nce. The epidermis is generally loosened upon the integument, so as to e peeled off with great facility. The most important lesions, and those hich seem to belong to the nature of the disease independent of compli-ations, are the altered condition of the blood, and congestions of differ-nt parts of the body, particularly the brain, serous membranes, kidneys, pleen, glands of Peyer, and intestinal follicles. We have already alluded the fact that, even when the cerebral symptoms have been most severe, nd we might expect to find evidences of violent inflammation of the rain, nothing is observed after death, in the majority of cases, but con-estion of the large veins and sinuses of the brain, of the pia mater, or f the cerebral substance. There is rarely any unnatural amount of serous ffusion into the ventricles, or meshes of the pia mater; and it is evident hat the symptoms have been due entirely to the vitiated condition of he blood. Nevertheless, effusions within the cranium may exist, in ome few cases, as has been already stated in the remarks upon hydro-ephalus.

with granular and fatty matters, and casts of t found in the matters vomited or in the cont death.

The condition of the skin resembles this being thickened, with a formation of numerous the sudoriferous glands being often obstructed

The glands of Brunner and Peyer are not they are sometimes reddened or softened. In the mesenteric glands are slightly inflamed an spleen is redder than usual and softened. Th sary relation to the form of the disease, since typhoid cases, and present in those of a differe

The kidneys are healthy, with the exception tion, unless the case has been complicated w circumstances they usually present the chara nephritis, which we have already described.

The heart occasionally presents the results of or investing membrane; and in some cases its ante-mortem clots.

The blood exhibits very different appearance viscid or serous, dark-colored or light, and flui being of variable color and density. The pro elements is changed. The fibrin maintains its of the fluid (3 parts in 1000), or it is very slig quantity of the globules is increased to 136 or 1 Andral, instead of 127, in 1000 parts. This inc fibrin may be in part the cause of the fibrinous sionally are found in the cavities of the heart, instrumental in causing death.

Diagnosis.—It is impossible to distinguish eruptive fevers by the symptoms which

h less; that of measles, on the contrary, is almost always from three
ur days; in scarlatina the rash appears suddenly and often spreads
the whole body in a single day; in measles it appears on the face first
extends gradually to the rest of the surface, seldom reaching the hands
feet before the end of the second day; the eruption of measles occurs
in distinct papules, which coalesce and form patches of an irregular
centic shape, while that of scarlatina is in the form of innumerable
ute dots or punctuations, placed so closely together as to give to large
ions of the surface a uniform color, like that produced by blushing.
color of the two eruptions is different, that of measles being dark
raspberry juice, and that of scarlatina of a more or less bright scarlet
. The presence of catarrhal symptoms in measles and their absence
scarlet fever; the absence of angina in the former disease, or its very
ht character, and the severity of the throat-affection in scarlatina; and
ly, the greater severity of the febrile symptoms, particularly the fre-
ncy of the pulse and the heat of skin in scarlatina, are other points
difference which will assist in making the diagnosis, rarely, it seems
me, difficult, still more certain. A very great frequency of the pulse
ne of the most unfailing symptoms of the early stage of scarlet fever.
almost always runs up to 140, 150, or 160, in young children, within the
t twelve or twenty-four hours, and to 120, 130, 140, or higher, in those
o are older. Nevertheless, this, like all other symptoms, is sometimes
nting. We have lately seen a boy, between five and six years old,
h a marked but very safe attack of the disease, whose pulse ranged
ween 80 and 90 throughout the sickness. This was, however, the only
se we have ever met with, in which the pulse remained so little disturbed.

It is sometimes very difficult to determine with precision between
*seola* and scarlet fever. By the eruption alone, we believe it to be often
possible. We have seen quite a number of cases in which the erup-
n of roseola resembled so closely that of scarlet fever, that we should
ve been obliged to confess our inability to make the distinction had it
t been for the other symptoms, and particularly the frequency of the
culation, the heat of the skin, and the throat-symptoms. The most
portant differential symptoms are the tint of the eruption, which in
seola is rose-colored, in scarlet fever bright-red or scarlet; the charac-
rs of the patches of eruption, which are more regular in shape, but of
ch smaller size in roseola than in scarlet fever; the absence or very
ght degree of anginose inflammation in roseola; and, what is decidedly
e most important of all, the very much slighter degree of febrile reac-
n in roseola, in which the pulse, instead of being doubled in frequency
it is in scarlet fever, is scarcely above its natural rate, and in which
e heat of skin is but little above the standard of health. Moreover,
seola is generally of shorter duration, and is a milder affection, and
erefore accompanied by far less fever and general disturbance of the
nstitution.

*Diphtheria* occasionally resembles scarlatina to so great an extent, as
have even led some observers to consider them identical. Thus, there
in diphtheria a pseudo-membranous angina, with swelling of the cervical

and, finally, they do not exercise any protective
each other.

There is a form of disease known as rubeol
rosalia (Richardson), in which there are some
measles and scarlatina; the eruption appearin
day, at first resembling that of measles, but l
that of scarlatina. Coryza and angina may bot
subsequent desquamation. Some authorities
the poisons of measles and scarlatina, while oth
disease, because epidemics of it occur when ne
tina are prevailing. Previous attacks of the
against it. In an extensive epidemic, of which
practice of Dr. G. Pepper, of this city, which a
ture, not a single case was followed by any of the
or scarlatina.

Prognosis.—It is impossible to obtain a use
scarlet fever, since the disease varies so greatl
and under different hygienic conditions, that the
one period are inapplicable to cases observed at
by the experience of almost every physician, and
writers. It is proved, also, by the following fact
p. 283) states that the mortality in the epidemi
about 1 in 12; of 99 cases, 8 died. MM. Rilliet
more than half their cases; of 87, the total, 46 w
let it be remarked, however, occurred in the Hospit
which will account for the heavy fatality. The de
the mortality may vary in the same place and u
treatment, is shown by the fact, mentioned by H
of eleven years the annual mortality from scarl
Fever Hospital, varied from 2.5 per cent. to 16.5

1 in 12. Lastly, to show the influence of the epidemic type upon ortality still more clearly, we may state that of the last series of observed, 78 in number, 43 occurred during the epidemic which l from the summer of 1856 to the spring of 1857, and of these only 1 in 14, died.

e prognosis must be based, therefore, in part on the character of the mic prevailing at the time. It must depend also on the nature of ase. Mild and regular cases are rarely fatal. Of 206 mild cases that been under our care, only three proved fatal. One of these would ably not have so terminated had it not been for the imprudence of urse. This was, in fact, the case of a young child who had recovered the eruptive stage of the disease, but whom the nurse carried out e room in the second week, notwithstanding express directions given o the contrary. The child took cold and was seized with catarrh slight anasarca; on the fifteenth day uræmic symptoms set in, and ied on the seventeenth day, comatose, and with convulsive move- ts of different parts of the body. The second case was that of the thirteen years old, already described, who died with sudden hydro- aloid symptoms, at the end of the second week. The third fatal case rred in a girl between eight and nine years old, who died suddenly e end of six weeks. The patient had convalesced sufficiently to have out several times, but remained very hydræmic and weak. After much fatigued one afternoon by playing with some little friends, was seized next day with vomiting, and soon after with great diffi- of breathing and extremely rapid and feeble action of the heart. e symptoms increased on the following day. The dyspnœa was severe, and was attended with cyanotic color of the hands and face, with cold colliquative sweats. The lungs were free, there was no h, and auscultation revealed no pericardial lesion. Death occurred enly at the end of a day and a half. No post-mortem was made, to circumstances that could not be controlled. Our own opinion and is, that the death was caused by a coagulum in the heart.

ave cases of scarlet fever are always, on the contrary, exceedingly erous: thus of 57 cases of this kind that we have had under charge, nearly a half, were fatal. In order to render the description of the toms of this class of cases more clear, we divided them into two s; one, in which the onset of the disease is instantaneous and most nt, being characterized by excessive disturbance of the nervous sys- taking the form usually of convulsions, but sometimes only of pro- coma; and a second, in which the symptoms of the onset, though e enough usually from the first to mark the character of the case as , are less violent than in the first group, and especially not marked e occurrence of convulsive phenomena. Of 16 cases belonging to the group, 11 died; while of 41 belonging to the second, 14 died. Violent us symptoms occurring early in scarlet fever augur, therefore, great er to the patient, since of 16 cases in which they were present, 11 , whilst of 41 in which they were more moderate, though still marked severe, only 14 died.

that they have seen recoveries take pla
of the patient had been very much dis
*ing the first fifteen days of scarlatina*,
vulsive movements, contractions, in a
locomotive apparatus, all, without exce
exactly with our own experience, tho
exceedingly dangerous are the symp
occur early in the disease. General
day of the disease in 7 of the 57 grave
of these not one terminated fortunate
second day, and of these three recover
curred on the ninth day, and this patie
there were no general convulsions, but
matic motions, with involuntary extens
and on the second day strabismus, with
motions. This case proved fatal. Of
marked disturbances of the muscular s
vorably. Of 8 subjects in which the co
the first day of the disease not one esca
symptoms appeared on or after the se
favorable cases occurred in a boy seven
vulsion, lasting several minutes, on the
was followed by delirium and coma alter
vulsions. The case was a most violent
the child at the termination very deaf
The second case occurred in a child
symptoms appeared on the ninth day, a
modic retraction of the head, and occas
They alternated with coma, and disapp
seventeenth and eighteenth, when the st

however, recovered perfectly. The fourth case was that of a boy ı five and six years old, who, on the second day, had an attack of convulsions, which were repeated frequently on the third day. atient continued very ill for several days, and when, at last, he to improve somewhat in the middle of the second week, it was hat he had lost entirely the power of speech, and all control over the whole of the locomotive apparatus of the body. He could lift his head nor turn it; the legs were immovable; the hands erfectly helpless. The only motion that remained was a jerking, ntly almost automatic, movement of the arms upon the shoulders, e forearms upon the arms. But even these were most irregular, adly co-ordinated. He was very much in the condition of a new-hild. It was very difficult to ascertain what the condition of his was; but after a short time we were able to satisfy ourselves that r and heard, and only after many weeks was he able to hold a very bject in his fingers, then to move his head from side to side, and at later period to hold it up. At the end of about two months, he sit in a chair when once placed in it, but could not sit on the floor ported. At the end of three months he was learning to walk by held up by the arms. He had never spoken a word. The only ap- to anything like articulation was his ability to hum a low gentle l note; his intellectual faculties, as exhibited by signs, had re- their natural condition at this time. At the end of ten months, ld speak intelligibly some three or four words. The fifth case was a male infant, nine months old, who, on the second day, had general convulsions, followed by very deep drowsiness. The erup-ecame intense, and on the third day the convulsive symptoms re- from time to time, but with less violence. On the fourth day he somewhat better, but on the fifth very severe anginose symptoms and he died.

in, in 18 of the 57 grave cases, severe and more or less prolonged m or coma occurred, and of these 12 died. We may conclude, re, that convulsive symptoms appearing early in scarlet fever in- a highly dangerous and, in all probability, a fatal attack; while and especially prolonged delirium or coma, are also extremely rable symptoms, but somewhat less so than are those of a convul-aracter.

r unfavorable symptoms are: extremely frequent or very violent intense heat or unnatural coolness of the skin; persistently elevated ature after deflorescence; deficiency or sudden disappearance of the on; a livid or purple tint of the eruption; slow and imperfect capil-rculation, as ascertained by pressure; the appearance of petechiæ, noses, or hemorrhages; violent vomiting and colliquative diarrhœa; violence of the throat-affection, whether from tumefaction, great ance of pseudo-membranous exudation, or disposition to ulceration loughing; and lastly, severe coryza or otorrhœa. A disposition to hoid state, indicated by dulness of the intelligence, dusky hue of

In addition to these remarks it may
social position influence the prognosis.
seem to predispose to a violent attack
the most malignant cases occur in very
hand, it has been noticed that in cert
tendency for the disease to assume a gr

Treatment.—*Hygienic treatment.*—I
of the mild or grave kind, the strictest
hygienic condition of the patient. The
ought to be, if possible, large, and at all
perature in winter should be carefully at
to be kept at from 68° to 70° F., during
unless the fever is violent and the child
it may be allowed to fall to 66°, or even
moderate, not enough to increase the hea
to endanger chilliness. During the latte
fever has subsided, and particularly when
the temperature of the chamber ought t
from 68° to 70°, and, when the child is p
maintained with great propriety at 72°.

One of the most important points in th
undoubtedly, the management of the pat
and especially during the desquamative p
that the child is liable, as we have alread
different complications and sequelæ of t
the most frequent, and at the same time t
which the patient is exposed. There can
opinions expressed by various writers, and
that the most common cause of this accide
ing of the body, no matter how produce

e attack has been a slight one only makes it the more necessary
y out this regulation, as it has been found by experience that
occurs more frequently after mild than after severe attacks. M.
dre (*Recherches Anat.-Pathol.*, p. 311) is of opinion that the patient
not to be allowed to leave the house until the skin, completely de-
of the old epidermis, shall have regained its suppleness, its smooth
lished appearance, and all its functions. When, therefore, after a
ase, the desquamation is completely terminated in three weeks, the
t, he thinks, may be allowed to go out. But, on the contrary, this
would be too short by one-half, if the eruption had been very in-
as the desquamation is, in such cases, scarcely finished on the
and feet at that time. Our own opinion, as already stated, is, that
cool seasons of the year, the patient ought to be secluded in the
during full four weeks.

*diet* should consist in the early stage, as a general rule, of prep-
ns of milk, or weak animal broths, according to the severity of the
nd the state of the stomach. If the fever be very severe, barley-
or arrowroot prepared with milk and water, may be given. Nothing
substantial than these articles ought to be permitted, in most cases,
after the patient is decidedly convalescent, when broth with rice
in it, or plain boiled rice, and then some light meat in small quan-
ay be allowed, until the child gradually resumes its old habits.
, however, the case runs on for a length of time, or symptoms of
ation come on, beef-essence may be given at once, and small quan-
of wine whey, or weak milk punch added, according to the degree
symptoms.

*atment of Mild Cases.*—A large majority of these cases need but
imple treatment. Some laxative, as magnesia, castor oil, or syrup
barb, in such dose as to procure two or three stools, may commence
atment. After this a diaphoretic may be given every two or four
If the skin is very hot and dry, we prefer the antimonial wine and
spirit of nitre, in the dose of two to four drops of the former, with
r ten of the latter; or a teaspoonful of neutral mixture, with a little
r spirit of Mindererus, may be substituted. At the same time a
hould be administered. This may be either a common bath at a
ate temperature (94° to 96°), or an affusion bath, given in the fol-
manner: Prepare a bucketful of warm water (96° to 98°) contain-
m half a pint to a pint of vinegar; undress the child, and place it
ng in a large tub, with its head and shoulders bent slightly for-
; then pour the vinegar and water from a pitcher over the body,
it fall from a height of two or three feet, in a small, steady stream,
nucha, so that it shall run over the whole surface and fall into the
The moment the bath is finished, wrap the child in a warm cotton
over which should be put a light blanket, and lay it in bed, or hold
he lap for twenty minutes or longer, if perspiration is induced, after
it is to be wiped dry and dressed. If the fever be violent and ac-
nied with great dryness of the skin, two bucketsful of water may
d. This bath is often followed by copious perspiration and sound,

the disease pursues a regular, uniform course, tl
toms assume a degree of activity which renders ı
necessary.

The febrile movement may be unusually activ
much restlessness, or by such an amount of d
threaten a change into the grave form of the m
kind it was customary at one time to use genera
late years, however, we have entirely abandoned
having found it either unnecessary or hurtful. V
usual restlessness, with violent complaints of hea
without very great fever, a somewhat active cath
is necessary to be careful in the use of purgatives;
and unsafe to give those which are irritating, or
might prove so, in a disease which, in its severe
disposition to choleraic states of the bowels. V
fore, give a medium dose of a laxative remedy, an
time, than run the risk of exciting by an overdos
tion which could scarcely fail to do mischief by in
lar course of the malady. For these reasons we g
nesia, followed by lemonade; to castor oil in oran
a dessert-spoonful for children over three years of
under that age; to simple syrup of rhubarb in tl
tablespoonful; to a teaspoonful of salts; or some
directions that the dose shall be repeated in six h
enema, if it fail to operate. At the same time the
directed, or the tepid immersion bath, ought to b
the twenty-four hours, according to its effects, t
body, and the degree of restlessness.

The angina needs no treatment whatever in a
cases. The physician should never, however, n

f water, or of a mixture of glycerine and water, applied in the same nd a solution of sulphate of copper and quinine (six grains of each ›unce of rose-water), which has been very much used and greatly led upon by the late Dr. C. D. Meigs, and which we have found eneficial. This is to be applied in the same manner as the solu- nitrate of silver. With one of these we have always succeeded ell in this class of cases. Rilliet and Barthez recommend the fol- preparation:

| | |
|---|---|
| ℞.—Acid Muriat., . . . . . . . | f ʒj vel f ʒij. |
| Mel Rosæ, . . . . . . . . . | f ℥j —M. |

proper to avoid, under the circumstances above described, the use ›tic applications, as they are not needed, and as they might aggra- ıe local disease.

ten becomes necessary, even in cases of this form, to employ tonics e period of the attack; and there is none which can be used more ageously than some one of the salts of quinia.

'erri chloridi has been of late recommended in this as well as in the form of the disease, and its administration is asserted to have a cy to prevent the development of albuminuria or dropsy.

ıin the last few years *inunction* has been highly recommended in atment of scarlet fever. It was first proposed and strongly urged, eve, upon the profession, by Dr. Schneeman, a German physician. hneeman makes use of bacon fat. He takes a piece about as large hand, still covered with its rind, in order to obtain a firm grasp :. On the soft side of the piece slits are made in various direc- ı order to allow the oozing out of the fat. The patient is to be with this as soon as we are aware of the nature of the case, from › foot, excepting the face and scalp, every morning and evening. bbing is to be so performed that the skin may be regularly but not ickly saturated with the fat. During the process only the part rubbed is to be uncovered, or the whole can be done under the ›thes. (*Ranking's Abst.*, No. 12, p. 26.)

our own part, we have never made use of the bacon fat for the e of inunction, except in two instances, being deterred by its dis- ble character. We have, however, employed inunction with other us substances very frequently. Indeed, for a number of years 'e have made use of it habitually in our cases. The ointment we is the following. We have tried others, but find this one the most ble and most convenient:

| | |
|---|---|
| ℞.—Glycerinæ, . . . . . . . . | f ʒj. |
| Ungt. Aq. Rosar., . . . . . . | ℥j.—M. |

'e can be no doubt, at the present time, that the employment of on in scarlet fever has proved a most useful addition to our former of treatment. In our hands it has had the effect of allaying, in all the violent irritation caused by the intense heat and inflammation

great is the comfort it gives to the patient
young children, still untaught to speak, tc
shorter or longer intervals, showing their
renewed. The frequency of the applicatio
When the eruption is intense, the skin very
marked, they should be made every two o
In milder cases they need to be repeated o
twenty-four hours.

*Treatment of grave cases.*—Since the pub
this work, we have entirely abandoned the
in grave cases of scarlatina, believing it to
demned both by sound theory and universa

*Purgatives* ought to be used with care, a
secure a soluble state of the bowels, and n
the onset of severe cases, attended with pro
toms, in particular, the exhibition of larg
ought to be carefully avoided. It cannot b
violently so important a system as the di
nervous system, in a disease like scarlet fe
to throw out an intense eruption upon th
already only too much disposition towards di
of the body.

The antiseptic salts of soda and magnesia,
have been highly recommended by Polli, o
their checking the fermentative action of th
blood. We have used them in 11 cases, c
severe, and the remaining 6 regular, and
ably. This experience is too small to base a
we are disposed by it to hope that these rem
At five years of age, five grains of the hy

ry, and particularly when the eruption is intense and accompanied
iolent itching and irritation.

*hs; lotions; affusions.*—We are disposed to believe that, on the
, we derive as much benefit, in grave cases of scarlet fever, from the
ous external employment of water, as from any other means of treat-
The particular mode in which it is to be made use of must depend
e character of the individual case. In some the warm, in others, the
ath; cool, cold, or tepid lotions; or affusions with water at various
eratures, must be applied according to the nature of the case. We
refer first to the opinions of different authorities upon this subject,
hen give the results of our experience in the matter.

e warm bath is recommended when the cutaneous action is slow and
rfect, the pulse rapid and small, and the nervous actions slow or
ular, or, in other words, in cases of an asthenic type, in which the
se assumes a low and typhoid disposition.

tions, by sponging with water at different temperatures, are highly
mmended by many authors, and often afford the best means of mod-
g the condition of the cutaneous surface. They are most useful
the skin is intensely hot and dry, and should then be employed at
nperature of from 75° to 90° or 92°, according to the degree of the
neous heat, and according also to their effects at the moment. They
to be continued for several moments, or for half an hour even, until
eat is reduced and the restlessness of the patient moderated. To be
ny service they must be repeated so soon as the temperature of the
rises again after it has been reduced by previous sponging. Usually
necessary to resort to them every hour or two hours, or even more
ently. It is scarcely needful to say that cool or cold lotions are to
sed only when the reaction is strong and well marked, and not when
skin is pale and cool, and the pulse feeble and rapid. Under these
r circumstances, lotions with warm or hot water, or warm or hot
s, in connection with internal stimuli, would be the proper remedies.

e come now to the consideration of another method of treatment,
h has been asserted to be most efficient in the violent forms of the
ase by several persons of high authority in medicine, while by others
considered dangerous and improper. We refer to the use of affusions
cold water. The treatment was particularly relied on by Dr. J. Cur-
of Edinburgh. Let it be observed, however, that Dr. Currie limits
use to cases to which he applies the term anginose, many of which, we
bt not from his description, ought to be classed as mild cases. He
tions another class of cases, which he thinks ought rather to be called
rpurata," characterized by "extreme feebleness and rapidity of the
se, and great fetor of the breath. . . . . The heat does not rise much
ve the standard of health. Great debility, oppression, headache, pain
he back, vomiting, and sometimes purging, accompany its rapid prog-
; the patient sinks into the low delirium, and expires on the second,
d, or fourth day. . . . . . The cold affusion is scarcely applicable to
nd the tepid affusion makes little impression upon it. In my experi-
e, indeed, all remedies have been equally unsuccessful. It outstrips

following remarks: "It has come to my kno
scarlatina, of the most malignant nature, th
out of bed, under the low delirium, with the s
pulse scarcely perceptible. In this state, su
several gallons of perfectly cold water were m
the supposed authority of this work! I need
were almost immediately fatal." We have b
much into detail, in regard to the use of col
intrinsic importance of the subject, and becaus
the work of MM. Rilliet and Barthez, who brin
as a strong argument in favor of their emplo
disease in which cerebral symptoms predomi
ommend them, however, except in cases in wh
strong, as indicated by very great heat of s
rapid, but not feeble pulse. In the famous cas
it is evident that the attacks were not malign
hot (108° and 109° F.), and no mention is m
lirium, much less of convulsive phenomena.
London, whose opinions upon all matters co
fevers are of course worthy of great weight,
*Fevers*, edited by Dr. Bulkley, New York, p. 1
of cold affusions: "Sanctioned by my uncle,
Edinburgh, this plan has been amply tried in
it has not realized the expectations of its prop

"The truth is that the cold affusion is applica
of cases. It is adapted for young people with h
and a burning hot skin, without plethora, with
energy; but it is inapplicable to the scarlati
with coma, phrenitis, or marked debility. It
cynanche maligna. It answers its purpose ve
two, but it is often impossible to contin

The child is to be undressed and placed erect or sitting in a tub,
four or five gallons of water, at from 60° to 70° F. are poured over
ead and body. The good effects of the remedy are said to be an
diate reduction of the heat, a diminution in the rapidity of the pulse,
in one of Dr. Gregory's children fell in half an hour after the cold
on from 160 to 120, a disposition to sleep and quiet, and, according
r. Gregory, a seeming arrest of the throat-affection. These good
s of the affusions are transient, however, as the heat of skin and
ity of the circulation return in the course of one or two hours. For
reason it is necessary to repeat them frequently, once in two or three
s at least, in order to render the effects permanent. Currie used
een affusions for one of his own children, and twelve for another, in
y-two hours. These were not, however, all cold. Gregory used for
hild five "good sousings," to use his own words, in twenty-four hours.
is measure has been extensively employed by Dr. Hiram Corson, of
tgomery County, Pennsylvania, and with remarkable success in at
one epidemic of the disease. Dr. Corson, however, used cold appli-
ns even more vigorously than as above described. He applied ice,
pped in cloths, to the throat externally, and caused small pieces to be
in the mouth; and bathed the entire body, in some cases for hours
ther, with iced water, applied by means of large sponges. The effects
is were a marked subsidence of the nervous symptoms, the frequency
he pulse, the heat of the skin, and intensity of the eruption; and in
nstance did any unfavorable results follow the application. Care was,
ourse, taken not to prolong the cold applications where evidences of
depressing action made their appearance.

M. Rilliet and Barthez give in the following words the conclusions of
ke in regard to the use of cold affusions: 1. Cold affusions are not
ted for a *general* method of treatment. 2. The slight, or simply in-
matory forms, do not all demand so energetic a treatment. 3. Their
loyment must be reserved for cases in which the disease is epidemic,
accompanied by intense heat and dryness of the skin, with smallness
acceleration of the pulse, and for those in which the cerebral symp-
s are very violent and characterized by great restlessness, alternating
h drowsiness, commencing from an early period of the disease. Scarlet
er under these circumstances, is so dangerous, they say, and so often
rtal, that recourse ought to be had to all curative means, and in chil-
n the cold affusions are much more strongly indicated than bleeding
. *cit.*, vol. ii, p. 653).

oth Gee (*Reynolds's Syst. of Med.*, vol. i, *loc. cit.*) and Hillier (*loc. cit.*)
ak of having seen marked benefit follow the use of cold affusion in
ere cases, attended by delirium, vomiting, diarrhœa, full pulse, and
at heat of skin. In cases where the affusion has been inadmissible
y recommend "packing" the patient in sheets wrung out of cold water,
then enveloping him with several blankets; after remaining thus for
ut an hour he should be taken out and put to bed as after an affusion.
ur own experience in the use of cold applications has not been very
nsive, as we have preferred the use of the tepid affusion bath, of im-

the part. This was a case attended with com retraction of the head. In addition to the iced water, were kept applied the greater par especially the affusions, were evidently adv covered.

We are disposed, on the whole, to believe above referred to, the free use of ice and co productive of great benefits. The excellen remedies in the treatment of cases of sunstro temperature, encourage us to hope much from scarlatina where the heat of skin is very inte

We have made use of lotions with cool grave cases. In two they were evidently usel and were perhaps injurious, as we believe no been better treated with prolonged warm bat to 95°, cold to the head, and internal stimul one in which the patient had two convulsions the second. The pulse rose at once to betwee trunk were very hot, whilst the extremities w either excessively dull or comatose. Cloths w constantly upon the head and the body, and sponged with cold water. The internal reme of ammonia and milk-punch. The patient i third day, so that the pulse came down to 152 though the child was still very drowsy and hea promising. On the fourth and fifth days, th the neck and throat swelled enormously, the became very large, the nasal passages disch grumous pus, the ears ran copiously, the fa branous, the deglutition grew worse and worse

[illegible]

with water of the temperature of the room (68° to 70°). As the became heated by contact with the skin, small pieces of ice were o the basin so as to keep the temperature at the point mentioned. end of four hours, the washing having been continued all the time, nd the patient decidedly more comfortable. The pulse had fallen , and increased in volume; the heat of skin was much reduced; the of the eruption had improved, having become much more scarlet in he capillary circulation was more active; the agitation and restless- ad very much moderated, and the child had slept somewhat at short als. This treatment, in conjunction with the internal administration solution of chlorinated soda, and small doses of spirit of turpen- was continued for several days, the sponging being used whenever at and restlessness were great, and the pulse very rapid. The child lesced about the end of the third week, but was unfortunately seized uræmic symptoms on the twenty-fifth day, and died in twenty-three , after the most frightful convulsions we ever saw.

thout attempting to describe more particularly our experience in idual cases, we shall proceed to give a summary of what we believe the best mode of employing the class of remedies now under con- ation (baths, lotions, and affusions). Of the various means that we employed or seen employed in grave cases, these alone, either singly connection with the use of stimulants, have seemed to us to exert a festly beneficial influence upon the disease. In cases attended with delirium, stupor, or coma, or with convulsive phenomena, in which xtremities are cool or coolish, even though the head and trunk may tensely hot, and where the eruption is scanty and imperfect, or co- s and of a dark and purple tint, the warm bath at 95° and 96°, con- d for twenty minutes or half an hour, and repeated every two or hours, in connection with the internal employment of stimulants, mmonia and brandy; and with cold to the head, either by means of ed cloths, or by a prolonged cold douche; and occasionally a few dry on the head, afford the best means of treatment that we are ac- nted with. Under these circumstances, the warm bath has always ared to ameliorate for the time being the condition of the patient. n being entirely comatose, or exceedingly heavy or delirious, the l has, while in the bath, often awakened from its stupor and regained ght degree of intelligence, so as to open its eyes, look round, and freely. In cases attended with convulsions, the warm bath, with cloths to the head, or better still, a prolonged cold douche upon the , will very generally cause the cessation of the convulsive symptoms. rtunately, however, the effects of this treatment are only too fre- tly but transient, for, though the heat of the skin has remained r less for some time after the immersion, the coma and sometimes isposition to convulsions have very soon returned. The same state- s are made by M. Guerctin (*loc. cit.*, p. 302). Nevertheless, these s, the frequently repeated warm bath, cold to the head, and internal ulation, offer, we believe, the best means that have as yet been dis- red of treating those malignant cases in which, within a few hours

in which, though the patient is heavy and dull, he is not co
vulsed, or if convulsed only momentarily so, and that fro
of the febrile reaction, and in which, if delirium exists, it
a higher kind than in the previous class of cases, the m
ment is the following. The affusion bath of vinegar and w
mended in our remarks upon the treatment of mild cases,
every two or three hours, at a temperature of from 90° to
bath the child should be wrapped in a cotton sheet, and pl
a light blanket, for twenty minutes or half an hour; when
should be rubbed all over with the ointment already de
head is to be kept cool by means of wetted cloths. The
necessary is a mild laxative, iced drinks, as lemonade,
mineral waters, the chlorate of potash solution already spo
mixture, and sweet spirit of nitre, or spirit of Mindererus.
any cause, as want of the necessary conveniences, or from
sometimes inspires in the child, the affusion bath cannot
we ought to make use, instead, of tepid or cold sponging
unction.

In yet milder cases than those just described, in whic
pulse is frequent, it is quite full and strong, in which the
abundant and bright in tint, and the whole cutaneous su
dry, and in which the nervous symptoms are not of a very
character, the only external means necessary to be used
sional tepid immersion bath, or better still, a warm affusion
frequent spongings with tepid or coolish water, and freque
The internal means should consist, as in the previous clas
cool and refrigerant drinks and simple diaphoretics.

*Tonics and stimulants.*—In certain grave cases of scarlet
lants are required from the very commencement of the atta
such is the opinion of some of the best medical authorities,

ions are the carbonate of ammonia, quinia, or Huxham's tincture k, and tincture of the chloride of iron; at the same time we would the use of the hyposulphite of soda, as already mentioned. It is ecessary to employ concentrated food, such as beef-tea, Liebig's xtract of beef, egg beaten up in milk, and stimulants, such as wine milk punch, or brandy and water. It ought not to be forgotten, ver, that while these remedies are being employed, the hot, warm, id bath, prolonged for some length of time, and repeated every two ee hours, or spongings, with cold to the head by means of wetted or by a cold douche, and frequent inunction, constitute quite as tant a part of the treatment.

slow and tedious cases of the disease, which perhaps were of a more ic type in the beginning, adynamic symptoms frequently occur after tack has been going on for one or two weeks. The pulse becomes ent and small, the skin cool and moist, or hot and cold by turns, the ie is dry and cracked, sordes collect upon the teeth, and there is ation, muttering delirium, and various nervous symptoms, which all y indicate great exhaustion of the vital powers. Under these cir- tances it is necessary to resort to whatever means are likely to up- the constitution, and impart to it strength to resist the slow disease a tends to destroy it. With this view we should resort to the same and stimulating plan of treatment, in conjunction with the use of entrated nourishment, as recommended above. The amount of stimu- dministered must of course be regulated by the condition of the , the character of the nervous symptoms, and the general evidences ostration present.

*eatment of the Angina.*—The pharyngeal inflammation requires a share of our attention in all grave cases of the disease.

the reaction be full and strong, and the inflammation and swelling e throat very great, it may be permissible to apply one or two leeches e angles of the jaw; but even in these cases this measure may prob- be dispensed with, while in the graver forms of the disease it should tirely avoided.

hen the external swelling is considerable, benefit is sometimes de- from the steady application of warm poultices to the part. They ld be inclosed in portions of thin, soft flannel, and secured by means very light cravat; they must be renewed every two or three hours. lications of spongiopiline, wrung out of hot water, are a convenient efficient mode of obtaining warmth and moisture. In cases attended great heat of the skin and fully developed pulse, cold applications e throat, consisting of pieces of ice wrapped in flannel, and applied nd the angles of the jaw, or of cloths wetted with iced-water, may properly and, we believe, advantageously be made use of. In one in which we made use of the cold cloths, they were evidently bene- l. In another case, in a boy between eight and nine years old, dy referred to, there appeared on the third day threatening an- se symptoms. On the fourth these had increased, and by the night e fifth day had reached such a height as to make us almost despair

pyretic symptoms. The pulse, which for the three n
running at 168, had fallen on the fourth to 140, and o
the skin was hot and dry, and upon the face had assu
tint; there was almost constant muttering delirium an
ing and violent jactitation painful to witness. The
much impeded that it was with great difficulty that the
the thinnest liquids. Up to this time the case had be
unctions, cold drinks, and a febrifuge containing spi
and sweet spirit of nitre. In the midst of these thre
and when we had almost lost hope, the late Dr. Char
saw the case with us, proposed abandoning all drugs,
cold applications externally, and giving stimuli. Ac
towel was wrung out of iced-water and wrapped aro
weak wine and water was given as often as the child c
cloth was dipped afresh into the water every few mi
ment was commenced about 1 A.M., and carried on ste
9 A.M. it was evident that the symptoms had somewhat
the afternoon of that day the patient was greatly bett
ment consisted principally in a moderation of the ph
so that both respiration and deglutition were much
color of the face had lessened; the pulse had risen in f
stronger; and the delirium and excessive jactitation
peared. On the day after this the external cervical s
very much the same, except that the œdema had n
The pharyngeal swelling had disappeared, the tonsils
their natural size, but the whole pharynx was covered w
of white exudation. The cold application, which of la
more sparingly, was now discontinued; the fauces we
solution of nitrate of silver of ten grains to the ounce; b
whey, and wine and water were given for nourishment
slowly recovered, after having had a large suppurati

to cause serious annoyance to the child and embarrass the respira-on, they ought to be removed by means of a sponge-mop or camel's-ir brush. This point in the treatment is a very important one, espe-ally in young children. We believe that we have rescued more than e patient by going three or four times a day to make use ourselves means by which to remove from the fauces the viscid, glue-like cretions, the purulent fluids, and the masses of pseudo-membranous cudation which collect in and occlude those passages, and which the ild often cannot, by any effort of its own, get rid of. The best mode f effecting this object is by the use of mops made of sponge or rag, stened to a stick or whalebone, or by the injection from a small yringe or elastic bottle of detergent washes or gargles into the throat, e mouth being held open and the tongue depressed by the handle of a poon. One of the best washes for this purpose is made of a strong de-oction of green tea containing alum; or we may employ sage tea and lum; or honey of roses and borax mixed with water; or capsicum tea; or ime-water; or, what is highly recommended by Dr. Watson as one of the est, a solution of common salt. When coryza is present, the nasal pas-ages should be cleansed by means of camel's-hair brushes, or by the njection of some of the mild washes just referred to, and then freely nointed with sweet oil or some mild ointment, or they may be touched with the wash used for the throat. To perform these little offices for the child almost always requires force, but they are followed by such comparative ease and comfort, and, we doubt not, such mitigation of the disease, that they ought to be insisted upon.

*Diarrhœa*, when present, probably depends on congestion and desquamation of the intestinal mucous membrane, and should be treated with bland demulcent drinks, and absorbent antacids, especially chalk mixture.

*Rheumatism* should be treated by opiates to allay the pain, and the swollen joints should be enveloped in bats of cotton. If suppuration should occur, either in connection with the rheumatic inflammation of the joints, or involving the glands or cellular tissue, and indicating a pyæmic tendency, large doses of quinia with stimulants should be given. The abscesses which may form should be opened so soon as fluctuation can be detected.

For the *otorrhœa* which sometimes occurs, it is seldom necessary to do more during the violence of the attack, than to cleanse the ears twice or three times a day, by syringing with warm water and castile soap, or with a weak solution of alum. After the violence of the attack has subsided, this complication should be treated as in idiopathic cases.

*Treatment of the Dropsy.*—In slight cases, the only treatment necessary is the use of some mild purgative, as castor oil or magnesia; a simple diuretic, such as cream of tartar or lemonade with sweet spirit of nitre, and an abundant supply of water; hot baths repeated from time to time; carefully regulated diet, and strict confinement to bed.

In severe cases, marked by considerable fever, and in which the urine is scanty, high-colored, and loaded with albumen, or in which it is dark-colored, owing to the presence in it of blood, the treatment must be some-

and safely. From the evidence brought forward in the Eu that we have seen, its efficacy seems to be left in consid MM. Rilliet and Barthez are of opinion, however, that it is worthy of trial. M. Cazenave (*loc. cit.*, p. 58) states that "M. B the disease reign epidemically in one of the lofty valleys of Sa and respect, almost without exception, children to whom had been administered." MM. Guersant and Blache after citing various accounts of its use, conclude that "thes undoubtedly, to be continued." According to Dr. Cond 441, 442), Dr. Irwin made an extensive trial of its prophyla South Carolina, and found that of two hundred and fifty took it, less than half a dozen had the disease, and that very McKee, in an extension of the same epidemic, used it with

Dr. Condie himself made use of it, "but although redness of the throat, and a diffuse scarlet efflorescence were pro majority of the cases, we never found it in any, to exert th fluence in mitigating the character, or preventing the occurr latina. The experiments were made during the prevalence and in numerous instances the subjects of them were attac case the efflorescence was kept up by the use of belladonna hours; in a week afterwards, this individual took the diseas violent form, and died on the fourth day."

By far the most thorough and careful examination of this and important matter that we are acquainted with, has been F. Peyre Porcher (*Charleston Med. Jour. and Rev.*, July, Porcher states that his paper contains the results of an exa about four hundred volumes. Towards the end of the art Dr. Porcher gives us his conclusions in the following words: " ing the testimony afforded by the preceding facts, our opinions, allowed to express them, are decidedly in favor of the prophyla of belladonna. However some may consider the evidence of character, and therefore unworthy of confidence, yet, from its from the careful way in which some observers conducted the and from the possibility of failures owing to the use of an infer prepared drug, we cannot but conceive that to discard it as decisive, would be indulging a spirit of irrational incredulity, the rejection of any amount of merely presumptive proof. But under circumstances like these, granting that the efficacy of is only problematical, none should hesitate to employ measures in their application, and so safe in their consequences. The avail ourselves of the prophylactic influence of belladonna, we can but regard as a violation of those sacred obligations, which leave nothing untried which *may* contribute so largely to the or eradication, of one of the severest inflictions of the hand of

Prof. Stillé, after a complete review of all the evidence that collected upon this subject (*Therapeutics*, vol. i, p. 788), con follows: "We feel bound to express the conviction that the virtues ladonna as a protection against scarlatina are so far proven, that nes the duty of practitioners to invoke their aid whenever the disease aks out in a locality where there are persons liable to the contagion."

r. Irwin gave it in the following manner. Three grains of the extract re dissolved in an ounce of cinnamon-water, and two or three drops of solution given morning and evening, to a child under one year old, d one drop more for every year above that age.

Hufeland's formula, which is the one we have always employed our- ves is, according to Rilliet and Barthez, as follows:

| | |
|---|---|
| ℞.—Extract. Belladonnæ, . . . . . . | gr. iij. |
| Alcohol, . . . . . . . . . | f℥j. |
| Aquæ Destillat, . . . . . . . | f℥ss. |

A drop morning and evening for each year of the age of the child.

In order to purify articles which have been exposed to scarlatina, they ould be either put in boiling water, or exposed to a temperature of over 0°, as we have seen that a temperature somewhat below the boiling- int of water destroys the activity of the virus.

## ARTICLE II.

### MEASLES, RUBEOLA, OR MORBILLI.

Definition; Frequency; Forms.—Measles are an epidemic and contagious exantheme, characterized by catarrhal symptoms, continued fever, and an eruption, generally on the fourth day, of a crimson rash, in the form of stigmatized dots, like flea-bites, slightly elevated, which coalesce into irregular circles or crescents. It ends about the seventh day by desquamation.

The frequency of the disease is very irregular in different years, because of its epidemic nature. Thus, according to the mortality tables of the Board of Health, there have been 2279 deaths from measles in this city during the past sixty years. In five of these years, as will be seen by a reference to the table at page 665, there is not a death recorded from this cause, while, on the other hand, the annual mortality exceeds 100 in eleven years, and 200 in two. During the same period, the deaths from scarlatina in this city, as already stated, amounted to 13,016.

Measles are probably a more common though a less fatal disease, and attack a larger number of persons than scarlet fever; thus, during a period of fifteen years, we have met with 314 cases of the former to 263 of the latter.

We shall describe two *forms* of the disease; the *regular* or *rubeola vulgaris;* and the *malignant* or *rubeola maligna.* We shall afterwards treat of its *irregularities* and *complications.*

Causes.—A chief cause of the disease is *epidemic* influence. Of this there can be no doubt, as it is proved by the evidence of all observers.

The period of incubation is very difficult t certainty as to the date when the disease becom stated as from five or six, to twenty days, or majority of cases, however, the eruption app days after exposure to the contagion, thus period of incubation from nine to twelve day we were able to determine with precision the sure to contagion and the appearance of the case, eleven in 1, twelve in 3, thirteen in 5, fo In 108 cases observed by M. Girard, of Marse *and Gaz.*, Aug. 21, 1869, p. 225), the eruptio sixteenth day only in 3 cases; in all the othe thirteenth or fourteenth day, never before the the sixteenth.

MM. Rilliet and Barthez conclude that meas contagious, and have longer incubative and pr fever.

The same authors are of opinion that variol rather more contagious, and that its period dromic stage are a little shorter than those of

Measles, like other contagious diseases, rar the same individual.

*Age.*—We find by uniting Dr. Emerson's tab Condie (*Dis. of Child.*, note, p. 100), that the dise quent between the age of one and two years, for in the second year, only 468 occurred between This does not agree, however, with our own exp of the disease that have come under our own obs was accurately recorded, only 36 occurred in t occurred between the end of the second

Of 290 cases that we have seen, in which the sex was noted, 156 rred in males, and 134 in females.

1862, Dr. Salisbury, of Ohio (*Amer. Jour. of Med. Sciences*, July and ber, 1862), published two elaborate articles, in which he attributed sles to the action of the fungus developed on damp, mouldy straw. eported the results of numerous cases in which this fungus had been ulated with the production of a modified form of rubeola, which, ever, protects the system against a future attack of true measles; and instances where measles had broken out in camps where damp straw used for bedding.

complete examination of this question, embodying the evidence of Woodward (*Camp Diseases of the U. S. Armies*, Philadelphia, 1863), the experiments of Dr. C. E. Smith, and one of ourselves, will be nd in a paper by Dr. H. C. Wood, Jr., in *The American Journal of Medical Sciences*, October, 1868, p. 342.

The results of the inoculation of nearly 50 cases, prove that in nearly ry instance, the introduction of the straw fungus into the system is irely without effect; and that in the few cases where any symptoms ve followed, they have not been those of true rubeola, nor have they tected the system from an attack of genuine measles.

In regard to the occurrence of camp measles also, Dr. Woodward re-arks, that it prevailed almost exclusively in regiments raised in the ral districts, while those from cities and towns were more or less com-etely exempt; and that the inevitable inference from this, confirmed personal inquiry, is that the recruits from the country had generally caped the disease before their enlistment, while those from towns had ually suffered from it at some previous period; a condition of things tirely at variance with the idea that the straw fungus is the veritable use of measles.

SYMPTOMS; COURSE; DURATION.—*Regular form of the disease.—Stage invasion.*—Measles begin with languor, irritability, sometimes chilli-ess, anorexia, aching in the back and limbs, fever, thirst, headache, and rious signs of irritation of the mucous membrane of the eyes, nose, uces, and larynx.

The chilliness or horripilations which are mentioned by almost all riters are difficult to appreciate in children. We have seldom known e child itself to complain of them, but upon inquiry of the mother or urse, have sometimes been told that they had observed some coolness the hands or feet, or a disposition to keep near the fire, and a desire r additional clothing. These, therefore, are not important symptoms. either is the aching in the back and limbs, as it is seldom complained , and can be ascertained in the older only by close questioning, or sus-ected in the younger by their complaining when they are moved. Fever very rarely absent. It almost always comes on with, or very soon after e other prodromes, but in rare cases does not begin until the second ay. It is almost invariably continued, after it once begins, except that remits somewhat about daylight and in the early part of the morning, become exacerbated again in the after-part of the day. Its intensity

tial or complete anorexia, and generally
and often complained of by children old
their sensations.

Vomiting occurs sometimes, but not as
symptoms commence with, or may even
stitute the most characteristic symptoms
only ones by which we are able to distingu
first stage. They are irritation and redne
that of the eyelids, lachrymation, suffusi
light, stuffing of the nose, coryza, sneezin
cough, some constriction of the thorax, a
of the eyes and nose are very important
above symptoms are not always present i
strongly marked in some instances, in ot
cases, absent. They are important, becau
nary cold in which they are present to t
accompanying general symptoms are sli
measles. We have rarely known the fauc
elicit complaints, and never to produce dif
sists generally only of slight redness of
pharynx, which is most strongly marked ab
makes its appearance. There is usually a
glands behind the jaw, and even of the cer
usually appears on the first day. Infrequ
comes more troublesome as the case progre
third or fourth day, a character which is p
lead to a suspicion as to the true nature of
hard, dry, rather hoarse, and occurs genera
pectoration, if present at all, is slight, an
mucus. At the same time the voice is ofte

bility, occasionally delirium at night, and, in vary rare cases, con- ons. Of 167 cases observed by Rilliet and Barthez, the latter symp- appeared in the first stage only in one, and was then confined to the alls. We have met with convulsions in 5 out of 314 cases, at the nning of the eruption, and in one, of which we shall not now speak, e close of the eruption. In one of the cases the convulsions occurred he first day, in a boy five years of age, of nervous temperament, and had had several convulsive attacks during the process of dentition. convulsions were general, but slight; they lasted only a short time, were not followed by any bad consequences. In the second case the ness began with fever, drowsiness, tremulous movements of the hands, rium, and in a few hours a slight general convulsion. On the second there were two attacks of convulsions, both, however, slight. The er symptoms continued as before. On the third day the child was er, the fever having diminished, and the nervous symptoms in great asure disappeared. On the fourth, fifth, and sixth days, the fever re- ned, and on the middle of the sixth day, a full measles rash made its earance. There was no recurrence of the nervous symptoms, and the e ended favorably. The third case occurred in a boy between seven d eight years old, of nervous and impressible temperament. The con- sive seizure took place just as the rash was coming out; it was very ght, and lasted not more than one or two minutes. In the fourth case, a boy in the second year of life, who had already had three convulsive acks from other causes, showing thereby a manifest predisposition to at kind of disorder, the convulsions occurred as in the previous case, st at the coming out of the eruption. In this case also the convulsions re slight, lasting only a few minutes. In neither of these two cases re the convulsions followed by dangerous symptoms. In the fifth and st case, the convulsions, as in the two preceding examples, occurred st as the rash was appearing; they were very slight, and were followed y no serious consequences. The subject of this case was a girl between ven and eight years old, who had previously had an attack of convul- ons produced by a severe febrile reaction occasioned by simple angina, d another attack, caused by indigestion.

MM. Guersant and Blache (*Dict. de Méd.*, t. 27, p. 658) mention another itial symptom, which has sometimes enabled them to recognize the ap- oach of measles before the eruption. This is a peculiar redness, a rose- lored punctuation, of the roof of the mouth, soft palate, and uvula, dif- ring from that of scarlatina. We have observed this symptom ourselves a few cases, but, as we have also seen it occasionally in roseola, doubt hether it is much to be relied upon.

M. Girard (*loc. cit.*) states that the early diagnosis may be aided by e fact, that a red papule appears near the free border of the velum palati veral days before the appearance of the eruption.

The *duration* of the initial stage is generally from three to four days. a large majority of the cases that we have seen, the eruption has begun appear in the course of the fourth day. This stage may, however, last ly one or two days, or be prolonged to five, six, or seven, and accord-

house had just recovered from an attac
tween twelve and thirteen years of age, t
day of the sickness, but was so faint a
until the sixth day, feel sure that it was
the eruption continued pale and insuffici
eruption, when it was out fully and com

*Second Stage, or that of Eruption.*—
some time in the course of the fourth da
or cheeks, or some other part of the face
neck and trunk, and finally to the extren
from twenty-four to forty-eight hours. I
spots, not unlike flea-bites, of a more or l
verging sometimes towards a deep red, of
edges, and of different sizes, varying bet
in diameter. When fully formed they co
felt to be slightly elevated and firm to the
When pressed upon, their color disappea
pressure is removed. Distinct and sca
mata soon become more numerous, and a
of an irregularly crescentic or semilunar
clusters and the consequent general tint
amount and intensity of the eruption. I
eruption is imperfect, the clusters of papu
are separated by large portions of health
contrary, the patches are so numerous, a
skin assumes a general deep-red tint. Oc
minute vesicles form on the summit of th
remarked that it can be observed on close
never run completely into each other, so a
face, unless it be over very small spaces a

respiration is slightly quickened in regular cases, but generally very beyond the natural rate. The tongue is covered with a yellowish hitish fur in its middle, while the edges and tip are clean and red. mains moist and soft unless some complication occurs. The tonsils, palate, and pharynx, present considerable redness, without tumefac- The abdomen commonly remains natural, though in some few cases e is slight soreness over its whole extent or in the iliac fossæ. Slight rhœa often occurs at this time. It seldom lasts more than from one ree days. In other cases the stools are natural, or there may be lerate constipation. The anorexia and thirst continue up to the stage ecline. About the time of the appearance of the rash there is often siderable restlessness, anxiety, starting and twitching in sleep, slight rium, and in children old enough to describe their sensations, com- nts of headache. The strength of the patient is not decidedly af- ed in most of the cases.

he urine during this stage is scanty, of dark-yellow color, and not ely contains a trace of albumen.

*tage of Decline and Desquamation.*—The disease having reached its ght in the course of the sixth day, the second of the eruption, it re- ins nearly stationary for one or two days longer, and begins to subside out the seventh or eighth of the disease, or third or fourth of the erup- n. The eruption fades first on the face and neck, and has often very ch or wholly subsided on those parts while it is still vivid on the ex- mities. The papules lose some of their color, become less prominent, minish in size, and when pressed upon do not disappear entirely as ey did at first, but leave a dull or yellowish stain behind. A little later ey assume a dirty yellow or copperish tint, which does not disappear der pressure, showing that a slight ecchymosis has taken place into e substance of the derm. These stains continue a variable length of me, and are finally removed by absorption. As the eruption disappears, slight furfuraceous desquamation takes place in a considerable number f the cases, but not by any means in all. This begins usually about the ce, and may either be limited to that part, or extend to other portions f the body. It is seldom general, however, and is often scarcely notice- ble. It occurs between the eighth and eleventh days of the disease, or urth and seventh of the rash.

From the moment the eruption passes its highest point of intensity, nd begins to decline, the other symptoms do the same. The pulse fast ses in frequency, and regains its ordinary characters. The heat of skin asses away, often with considerable perspiration, but sometimes with entle moisture only. The various catarrhal symptoms subside; the ough is less frequent, loses its hoarseness, becomes softer, and gradually eases. The expectoration, if present, now becomes more copious and inner, and presents nummular masses of muco-purulent matter floating a clear, watery fluid. The tongue cleans off; appetite returns; thirst eases; the restlessness and irritability disappear; and the child returns its ordinary condition of health.

*Temperature.*—According to the observations of Ringer (*Reynolds's*

**Irregularities of the Disease.**—U
only the anomalous symptoms of the di
of complications. Those which are pro
fully treated of when we come to conside

In some cases, the symptoms of the
they pass almost unobserved, and the cl
until the rash makes its appearance. In
of the temperament, or to the state of
are much more severe than usual, or sou
In one case that came under our own
old, the nausea and vomiting were very
nied by the most intense frontal headac
children generally do with tubercular
extremely restless, and at night delirio
came out on the fourth day, and was pe
and course; the unpleasant symptoms ce
patient recovered without any further ba
spoken of five cases accompanied by
mencement of the first stage. The cou
quent stages, was regular in all respect
sisters, seven and nine years old respecti
ment, the headache in the first stage w
application of leeches for its relief; yet
other characters.

The eruption presents various irregula
It has already been stated that the amou
to the severity of the case, although in
times the papules are comparatively small
consequently, the clusters in which they
spaces of healthy skin between. When t

the order of appearance of the eruption is reversed, and the papules r first on the trunk, thence spreading to the face.

have already described the dull yellowish stains which remain after apules have faded. These stains sometimes assume, in malignant , a livid or purplish hue, from the occurrence of passive hemorrhage the tissue of the derm. They may, however, assume a dark and ureous appearance, without any malignant or dangerous symptoms ever. This happened in a family in which one of us attended n cases of the disease in 1845. In three of them (boys of 10, 5, and ar old, respectively), the eruption, which was copious and regular in ecame in a single night, at the moment of decline, of a dark brown ght purple hue. The spots did not disappear at all under pressure, were evidently formed by true ecchymoses. The general symptoms all favorable. The only peculiarity to be observed was that the r had disappeared very suddenly, and that the extremities were htly cooler than natural. The convalescence was as usual, except the ecchymotic spots disappeared very slowly and gradually. We e, since the above-named period, seen a great many similar cases, but one have the symptoms been attended or followed by any evil consences.

everal authors describe a form of measles without eruption. They e that during the epidemic prevalence of the disease, some children sent all the catarrhal and febrile symptoms, without the eruption, and t they are protected against future attacks. The last assertion, at t, must be very difficult to prove. For our own part, we have never t with such cases, and should we ever seem to do so, would certainly call them measles, lest by so doing the parents might be induced, on re occasions, to expose the child unnecessarily to the disease, when, uld any evil consequences follow, they might justly question the wisn of the physician's advice.

Villan and other authors have described another variety of the dise, to which is applied the term rubeola sine catarrho, or measles with- catarrhal symptoms. Such cases are said to present no catarrhal nptoms whatever, and little or no febrile reaction. They are stated, reover, to occur generally during the epidemic prevalence of measles. st authors agree that this form does not protect the constitution inst the true disease, and some regard it only as an eruption resemg measles, dependent upon gastric disorder. Our own opinion is t such cases, of which we have seen a considerable number, are nothing re than examples of roseola. The entire absence of catarrhal sympns and of fever, or their very slight character, the short duration of cases, and the little constitutional disturbance exhibited by the pat, all serve to convince us that they cannot be attacks of true measles. recollect three such cases in particular, which, had they been accomnied by cough and fever, we should certainly have called measles. ey all occurred in infants. The rash was preceded for two or three s by feverishness, uneasiness, restlessness during sleep, and slight rrhœa, after which the eruption suddenly made its appearance and

few sporadic cases which are met witl
vicious state of the constitution of t
ble hygienic conditions in which he
ataxic or adynamic characters, which
the typhoid type of disease. They m
prodromic, or, as happens more freq
stage. When they begin in the first s
frequency and feebleness of the pulse;
nœa and oppression; and especially by
symptoms, as delirium or stupor. Some
make their appearance, and there is liv
with discharges of dark blood from the
and exhausting diarrhœa or dysenteric
the eruption to appear arrives, this com
irregularly, and generally assumes a li
owing to the passive exudation of blood
name sometimes given to such cases, of

This form of the disease assumes, in fa
pura hemorrhagica. The patient may die
some important organ, as the brain or lun
which sometimes complicate the disease,
which occur in consequence of the dissolv
or he may, after a severe struggle with th

COMPLICATIONS AND SEQUELÆ.—MM. R
chapter on the complications of the diseas
remarks. "Rubeola manifests itself by an
fluxion upon the skin and mucous membr
the disease depends upon the conservation
these two kinds of fluxions. That which i
general to predominate: if the

cover whether there be not some p
to convert the disorder from a mild
complicated, into one dangerous to
should any pulmonic complication be
patient.

The prognosis of the pulmonic con
to be very unfavorable in hospitals fo
state that scarcely one patient in fou
that we have seen, we have already s
if we recollect that one of these was
morbid dentition, it will be seen tha
pected, vastly more favorable in priva

There is, however, a tendency, espe
children, for the inflammation of the
come chronic, in which case the coug
termitting, but returning after the s
in cold, damp seasons of the year.

*Laryngitis* is a common complicatio
quoted, met with it in 35 of their 1
314 cases that came under our observ
pharyngitis.

Autopsies show that the laryngitis
panied with pseudo-membranous exud
simple, consisting merely of different
with thickening and softening of the m
intense and accompanied by ulceration
associated with an exudation of false m

The symptoms of this complication w
flammation assumes. It is unnecessar
are the same as those of the idiopathic

and a fourth softening. Some presented several of the lesions and in a few no lesion was found, though the symptoms of entero- had existed during life. We give these data from the above , not because they apply to private practice, but merely in order what are the tendencies of the disease, when disposed from un- le hygienic conditions to take on complications. We have met ly seven instances of intestinal inflammation in the 314 cases that ome under our own observation. Four of these occurred in the amily, in children of seven, five, three, and one year old respec- They were cases of entero-colitis, accompanied in two, with dys- symptoms, and all made their appearance towards the close of sease. The three remaining cases were attacks of dysentery, one ich was very severe, the stools amounting to twenty in the day, the other two were much less so.

intestinal complications may appear during the initial stage, or on y of eruption, but if not at one of those periods, they are most apt cur during the decline of the rash. The slight cases, constituting ommon diarrhœa of the disease, generally begin early, whilst the cases usually date from a later period of the disease. The *causes* se complications seem to be various exciting agents acting upon a us membrane predisposed, by the nature of the disease, to inflam- y action. These agents are said to be, generally, improper food, rise to indigestions; and the too early use of purgative remedies, axatives. In the cases observed by ourselves, it was impossible to t the causes.

e *symptoms* are more or less abundant diarrhœa, and in some, but ll the cases, sensibility with tumidity and tension of the abdomen. complication does not exert much influence upon the measles, which ly pursue their regular course. Sometimes, however, it occasions gravation of the febrile symptoms, and, when of a grave character, no doubt interfere with the regular progress of the eruptive disease. cording to Rilliet and Barthez, this complication was very seldom nly, or even chief cause of a fatal termination. Scarcely five or six l that they observed, could be considered as of that kind. It in- es very much, however, the danger of the pulmonic attacks, for the are much less serious, so long as they exist alone, while so soon as tinal inflammation is added to them, they become almost necessarily The seven cases that we met with recovered under simple treat- .

a considerable number of cases, a slight diarrhœa, to which we have dy referred as a common event in measles, occurred, but only in the above-mentioned did it amount to a serious complication.

one case that came under our observation, in a girl between five and ears old, fatal cerebral symptoms, due either to congestion of the or uræmia, occurred just as the rash was disappearing. There was ident cause whatever for this accident. There had been no impru- e either as to diet or exposure. The child was, however, of a tuber- family, the mother having at this very time tubercular disease of the

was then very dull and heavy, scarcel
ing the tongue slowly and after mucl
not a troublesome cough. Careful e
the thoracic organs. The respiration
very frequent. On the morning of the
neither answering questions nor prot
of the day there were some irregul
evening the right arm was rigidly fl
stiffly extended. The patient died th

In another case death occurred fron
internal cavities, caused apparently
hydræmical state of the blood, or po
which had been allowed to come on
the part of the parents to seek a ren
this condition of the circulating fluid.
second year of his age, and who had a
measles took place in the last week o
and not, according to the account of t
child, at all severe or dangerous in a
over, however, and though he was run
continued to look more and more pa
February 25th, when suddenly after 1
and became very restless. On the foll
He was then extremely pallid, and ver
ing was rapid and oppressed, the puls
and dry. He was evidently dropsical,
the feet also, were puffed, smooth, an
been opened the previous night. In th
skin was still hot, and the breathing
There was scarcely any cough. The

rable extent from the heart. There was a slight pleuritic adhe- the upper lobe of the right lung to the ribs. This was, however, ly of an ancient date. There was no other inflammation of the and none of the pericardium. Both lungs contained tubercles, vere not very numerous, but in the upper lobes of considerable here was no pneumonia, but both lungs were somewhat congested. art was larger than usual. In the right auricle there was a rather ind white, but soft concretion, and a smaller one in the right ven- The left cavities presented no concretions. The valves were y.

re are several other disorders which sometimes complicate or fol- easles, but as we have already given as much space to this subject limits of the work will allow, we shall be satisfied with a simple ration of them. They are otitis, ophthalmia, hemorrhages, gan- of the cheek or vulva, anasarca, and different cerebral symptoms. ill merely add, that measles are supposed by many observers to a special tendency to develop tubercular disease in the system, and t is necessary, therefore, to treat a child showing any predisposition it diathesis, or one born of tubercular parents, with particular cau- both at the time of the disease and during the convalescence. It is ncommon for measles to be conjoined with other eruptive diseases. ave known it to coexist with scarlatina in two instances, and Dr. G. ood has met with a fatal case of the same nature. It may be asso- d, likewise, with variola or with erysipelas; of the latter we have met one instance. We will mention here that of the whole 314 cases of les that we have observed, 257 were simple, and 57 complicated. The plications were as follows: bronchitis, 24; pneumonia, 6; laryngitis, it or severe, 8; dysentery, 7; pertussis, 7; scarlatina, 2; convulsions e early stage of the disease, 5, and in the latter stage, 3; keratitis, ntermittent fever, 1; erysipelas, 1; meningitis, 1; congestion of the n, 1; serous effusion into the internal cavities, 1. It ought to be ob- ed, however, that in the above enumeration several cases are referred wice, and one, a case in which pertussis, bronchitis, and convulsions irred, three times.

NATOMICAL LESIONS.—It is difficult to ascertain what are the charac- stic lesions of measles, because of the fact that most of the fatal cases e so in consequence of some complication. Some few fatal cases, ever, of the regular form, and some in which the complication was so ht as not to be likely to change the morbid appearances much, have to the following conclusions.

he lesions present in measles are the following: general congestion lifferent organs, which are colored red from the imbibition of blood sometimes softened. The congestion affects the mucous membranes icularly, and imparts to them a reddish or slightly blackish color. In e of the cases there is morbid development of the intestinal follicles. most important lesion, however, is that of the blood, which presents appearances common to the class pyrexiæ. These are normal propor- , or diminution, of the fibrinous, with increase of the globular element

sinuses of the brain, and of the auricl
livid and mottled appearance of some
of a dark color.

Diagnosis.—It is impossible to diagn
with any considerable certainty. The
suspected in that period from the appear
and sneezing, the frequent, hoarse, scra
ache, and thirst. If, in connection with
an epidemic of measles be prevailing at
been exposed to the contagion of the dis
more plausible. Nevertheless, any opini
given with much reservation.

We have already alluded to the opini
diagnosis in the early stage is aided by
ness of the roof of the mouth, or of a re

After the eruption has come out fully it
any other disease, unless it be roseola, the
bles that of measles very closely. It ma
attention to the concomitant symptoms,—
the more rapid evolution of the rash, a
catarrhal symptoms in roseola. In the v
measles may be confounded with variola.
to the size and shape of the papules, whi
flatter, less elevated, softer, and without
papules in variola, and the presence of the
suffice to distinguish them, even in the ear
general symptoms persist, or even becom
ance of the eruption, instead of abruptly
A little later, the appearance of vesicles o
face in variola, will show the difference st

ear first on the face, but on the trunk or wrists (Ringer); more tly become petechial, and last a much longer time.

n measles are conjoined with some other eruption, the diagnosis is made out by a careful study of the initial symptoms, and of the n on different parts of the body, for we can generally find well- l patches of the rash peculiar to each on some portions of the sur- In one of the cases of measles and scarlatina that we saw, the latter was developed first. The eruption made its appearance in the form; on the second day of the eruption, the child was seized with hoarse, laryngeal cough, and with redness of the eyes and lachry- n. These symptoms continued three days, at the end of which the scarlatinous rash had disappeared from the face, but remained upon the trunk and extremities. Characteristic measly papules made their appearance on the face, and pursued their regular course, on the trunk and extremities the measly eruption was never well d, being mixed with and disguised, as it were, by that of the scar- In the other case, the measles appeared first and went on regularly the eruption was declining and the general symptoms moderating, suddenly the fever, heat of skin, restlessness, and irritability re- d, and the child was very soon covered with the punctated scarlet of scarlatina.

OGNOSIS.—The prognosis of simple, uncomplicated measles is very able; the cases almost always recover without difficulty. This is n to be true by the following facts. Rilliet and Barthez report 36 of simple measles, of which all but one recovered. Of 257 cases we have seen, all terminated favorably. When, on the contrary, com- tions occur, the disease always becomes more or less dangerous, the ee of danger depending on the nature of the intercurrent affection, on the hygienic conditions in which the patient is placed. Thus, of cases observed by the above authors, in which some form of compli- ion occurred, 89 or about two-thirds proved fatal, while of the 53 com- ated cases that we have seen, only 6 were fatal. It must be recol- ted that the cases of the French observers all occurred under the favorable hygienic conditions of a large hospital, in children of bad stitution from congenital or acquired causes, whilst ours were ob- ved in private practice, where the hygienic conditions are favorable in same degree as they are unfavorable in hospitals.

The six fatal cases that came under our observation, proved so from e circumstances we are about to mention. The first occurred in a child ne months old, who was laboring under pertussis when attacked with easles. Bronchitis supervened upon the measles, and proved fatal by nvulsions, which came on during a paroxysm of hooping-cough, two eeks after the disappearance of the rubeola. The second case was that of boy, eighteen months old, who was prescribed for by an apothecary from hind his counter, until we saw him. The eruption made its appearance perfectly, we were told, and with a convulsion. After this he was very stless, and had rapid and difficult respiration and much cough. On the orning of the fourth day of the eruption, this had almost entirely dis-

the eleventh day. The
four and five years old, who appeared
but was attacked in ten days with
the case of congestion of the brain, a
complications, as proving fatal shortl
sixth was that of sudden dropsical eff
described in the remarks upon compli

To conclude, we may state that the
under the following circumstances:
the initial stage is of the proper durati
the face and extends gradually to the
movement is moderate; when the eru
or three days, gradually decreases; wh
tant symptoms diminish with the fever
the fading of the rash, assumes a natur
pale; when the appetite returns, the
notice continues, and lastly when the sl

On the contrary, the prognosis becom
circumstances: when the initial stage
it is accompanied by violent symptoms
tion, irritability, dyspnœa, much stupor
eruption is irregular in its appearance o
disappear with the eruption, whether it re
of hectic; when, after the eruption, the
becomes very pale; when the cough, dys
lastly, when the child remains weak, lang

It may be stated in conclusion, that th
favorable in proportion to the health of t
sion, and the regularity with which the dis
phases; while it becomes unfavorable, the

be somewhat softened. Every precaution should be observed to
chilliness, while at the same time it is nearly, if not quite as im-
, to avoid overheating the patient, either by excessive clothing,
eeping the temperature of the room too high. In winter, it is well
ct the temperature to be maintained at between 68° and 70° F.,
and day. If this be done, the child is not apt to take cold, even
it be uncovered at times, and yet the warmth is not oppressive.
ve often remarked that this temperature is just what it ought to be
the room is well ventilated, either by means of an open fireplace, or
nmunication with adjoining rooms; but when, on the contrary, the
is heated by a furnace-flue, and not ventilated at all or very imper-
, the same temperature, as indicated by the thermometer, becomes
nely close and oppressive. Under such circumstances, a door into
ljoining room, or if this cannot be, one into the entry, ought to be
more or less open, with a screen of some kind between it and the
, in order to secure a good ventilation, which is assuredly of the
highest importance, and yet to prevent by the screen a current of
air from chilling the patient. The diet during the febrile period
t to be very light. It may consist of milk and water, of arrowroot,
or tapioca, prepared with milk or water; or of crackers soaked in
r, with salt, or some similar food. When the eruption and fever have
eat measure disappeared, some light broth, either vegetable or ani-
with dry toast or bread, plain boiled rice, a roasted potato, or ice
n, may be added; and after all the symptoms have ceased, the usual
an be gradually resumed. The drinks may consist of simple water,
monade, orangeade, gum-water, or flaxseed-tea, with the addition of
e sweet nitre; or of weak infusions of balm, sweet-marjoram, or saffron,
scarilla with a few drops of hydrochloric or nitric acids. They may
ven in any reasonable quantity, at the temperature of the room.
persons have a great dread of cold water in this disease. We have
seen small quantities (half a wineglassful to a wineglassful at a
of the coldest water do any harm, and believe it to be useful when
ver is violent, and the heat very great. We once, however, saw a boy,
years old, attacked with violent colic and partial retrocession of the
ion, after swallowing suddenly a tumblerful of iced-water. The unant symptoms passed off in a few hours, and he had no difficulty
vards.

e patient should not be permitted to leave the room until a few days
the entire disappearance of the disease. It ought to be kept in the
until it has regained in some measure its strength and healthful
, as it will scarcely be able to resist exposure before.

ERAPEUTICAL TREATMENT.—The therapeutical management of the
ar form ought to be very simple. When the bowels have not been
d naturally for one or two days, it is proper to direct an enema to
ed, or, if the fever and restlessness are considerable, some mild laxa-
as a teaspoonful or dessert-spoonful of castor oil, a dessert or table-
ful of syrup of rhubarb, half a teaspoonful of magnesia for older
en, or less for younger, or some similar remedy, always selecting

mentioned, or a little sweet spirit of
considerable, with much headache,
would give small doses of antimonial
one to three or four drops of the forn
every two hours, and direct a warm
a day. Even if the fever be violent,
intense heat of skin, severe headach
in any form is unnecessary, as the sy
the use of the more mild remedies rec
found very useful, the employment of
opium, recommended at page 205.

Of the 257 regular cases that we h
only in 2: in one a venesection of fou
in consequence of the great violence
discoverable local affection; and in th
to the temples, for intense headache,
the same circumstances a warm bath,
fifteen or twenty minutes, will be fou
foot-bath may be used, and repeated tl
a day.

If any of the local symptoms becor
should be palliated by simple treatme
quent and hard, it is most effectually m
may be given in most cases without an
dication to its use is the presence of sev
bral symptom. A mild counter-irritant
throat is also useful; we have general
hartshorn. When the conjunctival infla
may be relieved by lotions with simple
sassafras-pith mucilage alone or

d digestible, and may consist of milk and bread, light broths, ea or essence of beef.

ocal inflammations occur, they may be treated by a few dry cups, ns of counter-irritants, of which the most suitable are mustard, urpentine, or ammonia. Blisters ought to be avoided, as they pt to occasion dangerous and even fatal sloughing.

ENT OF THE COMPLICATIONS.—*Bronchitis*, *Pneumonia*.—The reatment of these complications must depend upon the stage at y are developed, and upon the age and constitution of the sub- en they occur during the first stage, one of the most important the treatment is to endeavor to favor the appearance of the and when in the second stage, and the eruption has retroceded in part, the same indication applies with equal force. When ar during the third stage, they are to be treated without any the eruption, but always with reference to the fact that the pa- just passed through an acute febrile disease, which must have in some degree the vital powers.

be stated in general terms, that the treatment proper for these mmations when they occur as primary affections, is proper also, reservations, under the circumstances we are now considering. en local depletion should be employed only with the greatest indeed, we should recommend in preference the application of or of sinapisms.

ves should also be used with caution, on account of the dispo- astro-intestinal irritation which is always present in this disease. ractice is to employ moderate counter-irritation, in conjunction te doses of sulphurated antimony and Dover's powder, or a ontaining citrate of potash and syrup of ipecacuanha. When ases the skin is at all coolish, or bathed with too considerable tion, we have found the liquor ammoniæ acetatis a very useful

iversally acknowledged that it is exceedingly important to assist throwing out the rash, whenever these complications either pre- ormation, or cause its retrocession. The true mode of doing ure or alleviate the internal inflammation, which is the cause iculty. To attain this end the above plan of treatment ought tuted at once. At the same time, we may greatly assist the ap- f the eruption by a persevering employment of counter-irritants. f these is, we believe, mustard, and in some cases a warm bath. rd may be used in the form of plasters, poultices, or baths. plan in moderately severe cases, is to apply a mustard poultice rscapular space, and to make use of a mustard foot-bath, two imes a day, while in severe and urgent attacks we direct the and bath to be renewed every two or three hours, taking care, o apply the former alternately to the front and back of the rder to avoid all possibility of too violent an action upon the feet and limbs also ought to be carefully watched, to avoid the er. We have had occasion to observe the great efficacy of this

we used the poultices and f
and gave internally the spiritus Mind
else was done. On the sixth day, wl
from the interscapular space, the int
covered with the measly stigmata, w
other part of the surface. From thi
and the child recovered rapidly.

The warm bath may be used under
be given with great care, the child be
moment it is removed from the wate
chilliness. It may either lie for a sh
dry beneath it, and then dressed.

In some of the cases of bronchitis,
attended with extensive subcrepitant
stances we have found the internal u
lygala seneka, with an occasional revu

The *diarrhœa* which occurs so freq
ment. Indeed, unless it indicates evi
nied by frequent mucous or bloody sto
is better not to interfere with it, beyon
diet. When attended, however, with t
must be treated by astringents, by opi
application of poultices to the abdomen
to ourselves recovered under the use of l
three times a day, the strictest diet, and

*Laryngitis*, as it occurs in most of the
beyond careful avoidance of cold, the us
vulsives to the neck. It is very seldom o
however, it assumes the character of pse
be treated with all activity

, and cold applications to the head. When the symptoms are and when the heat is intense, it has been proposed to use cold in the manner recommended in scarlatina. The evidence upon this s not very conclusive, and as we have never used them, nor seen sed, nor indeed seen any necessity for a resort to them, we can o opinion in regard to their value.

have met with five cases of convulsions in the first stage. One oc- in a boy five years old; the convulsions were slight, lasted not han ten or fifteen minutes, and were followed by no bad symptoms. ntelligence of the child returned very soon afterwards. The only ly used was a warm bath. The other cases have already been de- d.

en convulsions occur in the second or third stages, it is very im- nt to ascertain whether they are not the result of some local disease. of the three cases that came under our notice accompanied violent s of bronchitis. The third was caused by congestion of the brain. the treatment must be directed against the local disease, if that can tected. When, on the contrary, the convulsions seem to depend on us irritation, they may be treated with baths, revulsives, purgatives, he careful administration of opium, as recommended by Sydenham, nd, Rilliet and Barthez, and other authors, or of camphor, assa- a, musk, or hyoscyamus. If accompanied by intense heat and great ss of the skin, without local complications, cold or tepid lotions also be tried.

treatment suitable when any of the complications or sequelæ be- chronic, will be found in the articles devoted to the respective dis- Bearing in mind the tendency to the development of scrofula or culosis after this disease, the most careful attention should be paid hygienic measures; and alteratives and tonics, as syr. ferri iodid., ver oil, and quinia, should be administered.

## ARTICLE III.

### VARIOLA, OR SMALL-POX.

FINITION; FREQUENCY; FORMS.—Variola is an epidemic and con- us disease, characterized by an initial fever, lasting from three to lays, and followed by an eruption at first papular, then vesicular, fterwards pustular; the eruption attains maturity in from six to days, after which the pustules are converted by desiccation into , which fall off between the fifteenth and twenty-fifth days.

*frequency* of the disease varies greatly in different years, because epidemic nature. It is far less common in childhood amongst the le and upper classes of the community, than either measles or scar-

a greater extent amongst the poor and destitu
attention to vaccination necessary to preserve

We abstract from the article already refer
showing the entire annual mortality from v
gether with the relative mortality during the
past twenty years.

MORTALITY FROM VARIO

| | Under 1 year. | Between 1 and 2 year |
|---|---|---|
| 1848, . . . . . | 21 | 13 |
| 1849, . . . . . | 25 | 20 |
| 1850, . . . . . | 13 | 8 |
| 1851, . . . . . | 40 | 30 |
| 1852, . . . . . | 89 | 54 |
| 1853, . . . . . | 22 | 9 |
| 1854, . . . . . | 12 | 4 |
| 1855, . . . . . | 57 | 39 |
| 1856, . . . . . | 86 | 44 |
| 1857, . . . . . | 19 | 17 |
| 1858, . . . . . | 1 | 2 |
| 1859, . . . . . | 0 | 0 |
| 1860, . . . . . | 14 | 10 |
| 1861, . . . . . | 159 | 105 |
| 1862, . . . . . | 52 | 44 |
| 1863, . . . . . | 83 | 24 |
| 1864, . . . . . | 57 | 31 |
| 1865, . . . . . | 104 | 50 |
| 1866, . . . . . | 82 | 17 |
| 1867, . . . . . | 16 | 4 |
| 1868, . . . . . | 0 | 0 |
| Total, . . . . | 852 | 525 |

SES.—The principal cause of variola is universally acknowledged ontagion. It is generally admitted also that it is propagated at periods by epidemic influence.

s not clearly ascertained at what period of its course the disease quires the property of infectiousness. Some assert that it is not after suppuration is established. This is, however, to say the least, ful, and it is best, therefore, to take any precaution that may be sary to prevent the extension of the disease from the moment that al nature becomes apparent. There can be no doubt that the body still impart the disease after death, and that clothes worn by the nt retain the contagious principle, unless freely exposed to the air, ays, months, and, it is said, even for years. It is also capable of ting furniture or letters, and may thus propagate the disease at any nce, and for an indefinite period, by fomites.

e attack protects the constitution, in the great majority of cases, st subsequent contagion. When persons who have once had the se, contract it again, it almost always assumes a much milder and langerous form.

e period of incubation, or the time elapsing between the reception e poison and the onset of the malady, varies generally between nine twelve days. It may, however, be more or less than the periods just ioned.

MPTOMS; COURSE; DURATION.—*Regular form of the Disease.*—We describe three stages of the disease: 1. That of the initial or erup-fever. 2. That of the progress and maturation of the eruption; and, hat of decline or desiccation. In addition to these, some writers another stage, that of incubation, which includes the period be-n the introduction of the poison into the system, and the appearance e first symptoms. This stage is seldom marked by symptoms suffi-ly characteristic to enable us to detect the approaching disease, and any instances is probably entirely unnoticed by the patient.

e *first stage*, or that of initiatory fever, commences generally in chil-with pains in the bones and loins, and sometimes with rigors or ness, accompanied with headache, and soon followed by fever. sea and vomiting often exist from the first, or come on soon after the arance of fever and headache. At the same time there is loss of tite, thirst, and more or less obstinate constipation. The tongue is t the point and edges. One of the characteristic symptoms of this is pain in the loins, which generally dates from the first or second and which, though varying much in degree, is usually severe. The nts often complain also of abdominal pains, which seem to be colicky, are referred either to the epigastric or umbilical region.

ver and headache are the most constant of all the initial symptoms. chilliness and rigors which frequently exist in adults, are not easily tained in the cases of children, and are therefore much less impor-

The fever varies greatly as to degree; the heat of skin is generally iderable; and may be accompanied either with dryness or moisture. pulse is commonly full and frequent. The headache is usually frontal

fluent attacks, the eruption, as a general rule, be
and discrete cases.

*Second stage, or that of eruption.*—Some time
day after the invasion of the attack, the eruptio
its appearance in the form of small, isolated, a
which soon become projecting and solid, or in o
into papules. The papules are from a third tc
diameter, of a more or less vivid red color, whic
sure, to return immediately when the pressure
also hard, and feel almost like shot imbedded in
shows itself first on the face, and generally ab
and then extends to the rest of the face, to the
and hands. It sometimes happens, particularly
that the eruption appears first about the genita
cases it is first observed on the lower part of the
The papules increase gradually in size and pro
three days, and, as a general rule, some time in
day of the eruption, undergo a change into vesi
place by the formation on the top of each papu
elevation of the cuticle, beneath which is depo
The conversion of the papules into vesicles occ
then on the neck, trunk, and extremities. The v
than the papules, and acuminated in shape, but
come gradually flattened and depressed in the
cover the whole papule, and before long exce
changes take place, the fluid they contain loses i
opaline, and by degrees the vesicles are transf
thus the third stage of the eruption or that of su

The pocks are more or less numerous, acco
severity of the eruption. When scattered over

int, they run together, so that the spaces between the pocks are of or less bright red color. In confluent attacks, again, the areolæ re or less imperfect, according to the manner in which the vesicles ouped together.

change of the vesicles into pustules takes place generally from the to the sixth day of the eruption. During this process the fluid of cks becomes more and more opaque, whitish, and at length assumes owish color, being in fact converted from serum into pus. At the time the pocks become larger, begin to distend, and, as they ap- h complete maturation, gradually lose their umbilicated shape and ne convex on the surface. The formation of the pustules follows ame course as did the vesicles, beginning on the face and extending e to the neck, trunk, and extremities. The areolæ that have just described as existing during the vesicular stage of the disease, con- during the early part of the stage of pustulation, but decline to- ls its termination, assuming as they disappear a purple tint. The ber of pustules is in proportion of course to that of the vesicles, but the increase in size of the pocks during the changes from papules vesicles and pustules, the eruption, when at its height, seems to be tly more extensive than would have seemed probable at the begin- of the first stage. As a general rule the pocks are most numerous he face, and after that part on the neck and limbs. On the trunk eruption is always much less abundant than on other parts of the y, and even when confluent in the highest degree on the face and neck, generally so only in patches on the limbs, while it is discrete on the ax and abdomen.

imultaneously with the eruption upon the skin, there occurs one also n the mucous membranes, particularly those of the mouth, nasal pas- es, fauces, eyelids, and sometimes of the prepuce and vulva. It begins more or less vivid redness of the membrane, which is followed by production of little elevations, the real nature of which, whether ular or vesicular, seems not to be clearly determined. About the nd or third day these red elevations assume the appearance of small, tish, rounded, and umbilicated pseudo-membranous points, which last erally about five days, and are then detached, leaving usually a little ration or erosion, which heals without leaving a cicatrix.

short time after the appearance of the pustules in the mouth and at, a true inflammation of the mucous membrane of those parts takes e. When the gums are inflamed they become swelled, red, and ngy, and are dotted over with white pseudo-membranous points of a nded shape. Sometimes the velum pendulum, and more rarely the gue, present the same white points, with redness and injection of the nbrane between. In most of the cases there is also partial or general ammation of the pharynx, which occurs subsequently to the formation he variolous pustules. The existence of this inflammation is denoted more or less severe sore throat, attended with difficulty of swallowing, with swelling and tenderness of the submaxillary glands. When the ous eruption extends to the larynx, as often happens, there is pain in

the subcutaneous cellular tissue, the degree o
tent of the eruption. The skin becomes ten
under the finger, and more or less hot and
greatest upon the face, where it commences a
of the eruption, and goes on increasing for fi
much pain, stiffness, and inconvenience to th
minishes when desiccation begins, and cease
accomplished.

It is important to study carefully the gener
stage. The fever which existed during the in
tinues during the first day or two of the eru
papules are fully thrown out, the fever subsi
so that the pulse falls from 100, 120, or 140
and the heat of skin diminishes at the same
without fever usually throughout the vesicul
that is to say, until the fourth, fifth, or sixth
appetite sometimes returns, sleep is tranquil
is in most respects well and comfortable.

About the fifth or sixth day of the eruption
tion of the pustules is nearly completed on th
commencing on the extremities, a new fever,
*secondary fever* is applied, makes its appeara
to 88, 100, 120, and 140, and becomes strong
skin is hot and dry. After continuing for son
diminishes after the suppuration is fully establi
the time that desiccation is nearly completed
menced upon the limbs. It ceases generally,
or eleventh day, having lasted between four
of fever is evidently the consequence of the s
ease, or of the conversion of the vesicles into

Towards the termination of the second stag

rts the whole pustule into a hard crust; in others the whole sur-
at the same time; while in others again, the epidermis gives
allows the contained fluid to escape, which then hardens into
, irregular crusts, which become brown before they fall off. Some
stules, particularly those upon the arms and legs, do not form
ll, but shrink away from the absorption of their fluid, leaving
thing but pellicles of cuticle, which fall off by desquamation.

squamation or falling of the crusts begins from the eleventh to
nth, and ends somewhere between the nineteenth, twenty-fifth,
fortieth days of the eruption. When the scabs fall off the ap-
presented by the skin beneath vary in different cases. In some
ceration and loss of substance of the derm has taken place,
es all the characters of a suppurating ulcer when desquamation
early in the disease; when that process occurs at a later period,
is found to be dry and cicatrized. In both these forms of des-
n, the cicatrices form little pits or depressions, which remain
fe. In other instances the fall of the scabs leaves red and exco-
rfaces which are on a level with the surrounding skin, but which
leaving blotches of a reddish-brown color, that do not disappear
for months. No cicatrices remain when desquamation takes
his manner. In a third series of cases the crusts do not fall
surface beneath has completely cicatrized, and the only traces
d are more or less deeply tinted reddish spots, with occasional
furaceous exfoliation of the cuticle, all of which disappear en-
er a time without leaving pits or cicatrices.

clude the account of the symptoms of the disease, we have a few
say in regard to the condition of some of the important organs
ut the course of the malady.

*gue* presents no appearances peculiar to the disease, other than
ion already described. It is generally moist, more or less furred,
r pale or red in color. The *abdomen* usually remains soft and
led, though in some instances it is slightly tumid and hard, with
l pains in the epigastric, umbilical, or iliac regions; in simple
latter symptoms rarely last more than a short time, and when
they are almost always the sign of some complication. The
*ion* which exists during the initiatory stage generally continues
ut the disease, though in some instances a slight diarrhœa occurs
end of the first or second week, after which the bowels regain
ural condition. If severe diarrhœa should make its appearance,
ost always the sign of a dangerous complication. The *nausea*
*ting* which are so often present during the initial stage, cease
appearance of the eruption, and recur only in rare cases, or in
nce of some complication. The *appetite* is almost always lost
e course of the disease, though it sometimes returns in the period
the termination of the initial and the commencement of the sec-
ver; *thirst* is acute as a general rule, and more or less so accord-
e violence of the fever.

*rine* presents, during the course of the disease, the ordinary

in about 30 per cent. of all cases. In the
often contains blood corpuscles, or is deepl
tine. After the subsidence of the seconda
becomes very abundant, of pale color, and
our cases, in a girl aged 18 years, the daily
the tenth to the thirteenth day of the erupt
sp. gr. 1001, as clear as spring-water, contai
fair proportion of chlorides. In another c
years, the patient also passed, on the eigh
clear urine, of sp. gr. 1007, without album
chlorides. In a third case, in a boy aged 1
twelfth day of the eruption, was f℥xlv.

The *strength* of the child is not, as a gen
except in severe and dangerous cases. *Res*
*and delirium*, which are of such frequent
eases of children, are not usually very stron
of variola. They exist, but it is to a moder
irregular, and confluent cases, on the contr
delirium, are present in a very high degree,
tion of the attack, or throughout its cours
bad augury.

We shall here conclude the history of t
form of the disease. We have not given a
crete and confluent cases, as they are merely
affection; the latter being much more seve
greater intensity, than the former. We wil
symptoms are very severe in confluent cas
those which indicate disorder of the nervou

We shall proceed next to a description of
the disease, or, as expressed by some write

portant of these are the greater infrequency of headache, vomiting, he lumbar pains; the presence of diarrhœa rather than constipa- e greater frequency of sleeplessness, oppression, and restless- nd, as a general rule, the earlier appearance of the eruption.

econd or eruptive stage generally passes through its periods with reater rapidity, so that the conversion of the papules into vesicles as early as the first or second day, and that of the vesicles into s, between the second and fourth days. In some few cases, on the y, the eruption is retarded, and the papules may remain unchanged even as the fifth or sixth day. The progress of the eruption is so ar sometimes that there may exist upon the same surface, papules, s, pustules, and scabs.

appearances presented by the eruption often differ widely from which have been described as characteristic of the regular disease. apules may be pale, irregular, uneven, and destitute of areolæ; and this happens, the vesicles and pustules which follow usually present me peculiarities. In other instances the papules and areolæ are of ple-red color, and the vesicles, instead of being transparent or h, are also reddish, and appear to be filled with a bloody serum. ustules in these cases also contain a sanguinolent fluid, and when n, their contents escape and form bloody scabs. In this variety of isease, which is called *hemorrhagic*, the papules and vesicles are mall; they are developed slowly, and remain flat and undistended, eneral rule, whilst in a few cases they are of a larger size, but re- almost always flattened in shape and unfilled. The scabs, when they are thin, soft, easily detached, and leave beneath bleeding surfaces carred pits. This form of the eruption, indicating, as it does, a pro- alteration of the crasis of the blood, with a tendency to passive rrhages from every surface, is associated with the gravest typhoid of the system, and is indicative of the greatest possible danger .

e fever of the initial stage rarely subsides in irregular variola, upon ppearance of the eruption, as it does in the regular disease; but, on ontrary, usually goes on augmenting. The distinction, therefore, rimary and secondary fever does not properly exist. Sometimes, ver, a notable increase of fever does take place at the period when esicular passes into the pustular stage of the eruption. The fever ually more violent in the form of the disease under consideration, in regular attacks, the pulse being full and large, and rising as high 0. In fatal cases it becomes small towards the termination. The s generally very hot and dry.

e appearance of the tongue, condition of the abdomen, appetite, , and nervous symptoms, are of the same character as in the regu- rm, except that the signs which they present are more severe and orable, particularly the delirium, agitation, and cries.

RIOLOID, OR MODIFIED SMALL-POX.—This is a term now usually ap- to the modified form of the disease, as it occurs in individuals who

nervous symptoms which exist in regul
or, if so, in a very slight degree. The
those of true small-pox, but usually the
discrete in their arrangement. The initi
side completely upon the appearance of
seems perfectly well.

The progress and character of the eru
the regular form of the disease, with th
more rapidly effected, and, as a consequ
is rendered by so much the shorter.
vesicles at a much earlier period—as e
The vesicles soon assume a whitish, opa
cated, and in the course of the second o
pustules. The suppurative stage of the e
accompanied by the same marked secon
ease. When the fever does occur, it is g
ing merely in slight acceleration of the p
of skin, and in one or two days it disapp
not fill usually so well as in regular vari
contents are rather sero-purulent, than
the term. The third stage occurs earli
more rapidly than in true small-pox; d
speedily finished, and the falling of the s
the eighth day of the eruption, is usually
fourteenth. After desquamation is compl
ease left are reddish spots or blotches, wh
out leaving cicatrices. The whole durat
from ten to twenty days.

Complications.—The most frequent a
variola in children, are inflammations of

om those which have been described as characteristic of the regu-
l.

OMICAL LESIONS.—The characteristic lesions of small-pox are a
deteriorated state of the blood, congestion of the internal organs,
inflammation of the skin and mucous membrane constituting the
n. The blood is found to be entirely liquid and uncoagulable, and
rk color; or if coagula exist, they are small, soft, and very dark in
The exceptions to this rule are those in which some acute and
inflammation exists, under which circumstances the dissolved state
blood is less marked, and fully-formed coagula are more abundant.
ngestion referred to affects almost the whole system. The muscles
m and of a deep red color; the membranes of the brain are strongly
d, the sinuses are filled with blood, and the cerebral substance pre-
numerous red points or dots. The vessels of the lungs contain a
quantity of blood, and the liver, spleen, and kidneys, are all deeply
sted.

condition of the mucous membranes is important. The pharynx,
x, and trachea, present an eruption, or simple inflammation without
ion. The eruption exists under the aspect of small, circular, thin,
hitish pseudo-membranous points, scattered over the mucous tissue,
lightly adherent to it, beneath which that tissue is often observed
red and inflamed. At a more advanced degree, and in severer cases,
lse membranes have disappeared, and in their places we find circu-
cerations, which are either superficial, or they penetrate the tissue
e mucous coat and rest upon the muscular, or even pierce that and
to the cartilaginous tissue beneath. In addition to these lesions
und inflammation of the mucous tissue with its consequences, red-
softening, thickening, and extensive deposits of false membrane,
distinct from the appearances above described as characteristic of
ruption upon these tissues.

has been a contested point whether a true vesicular or pustular erup-
ever exists upon the mucous lining of the stomach and intestines.
general opinion appears now to be, however, that the changes ob-
d in these organs cannot be ascribed to the formation either of vesi-
or pustules. The appearances that have led some observers to con-
them as the result of a proper eruption, are the following. The fol-
at the commencement and termination of the small intestines, and
rer cases, of the large intestine also, present an abnormal degree of
lopment, appearing in the form of small hemispherical or pointed, and
times flattened projections, on which there often exists a dark, and
times depressed central point. At the same time the plaques of
r are often enlarged, more projecting than usual, softened, and red.

e *anatomy of the variolous pock* is important and interesting. When
icle is opened soon after its formation, it is found to contain nothing
little serosity which is perfectly limpid and alkaline, while the skin
ath is red, softened, and moist. The umbilicated character depends
filiform adhesion between the centre of the pock and the surface of
kin beneath. This adhesion is broken, when, at a later period, the

points enlarge, and meeting, unite, an
disk, uneven upon its surface, and whi
or is covered at first with serosity and
membrane is secreted originally by the
period it forms an adhesion to the inne
later in the progress of the pock, it b
and remains loose and free in the cavi
the fluid contents of the latter.

Diagnosis.—The most important poi
recognition during the prodromic or in
that can be depended upon as indicat
bility the approach of the disease, are th
constipation, bilious vomiting, and seve
previously vaccinated, and in whom the
accounting for the symptoms enumerat
cumstances, the disease be extensively
more, if the child has been exposed to t
diagnosis becomes almost certain. Afte
ance the diagnosis is seldom doubtful.
first few hours, but the hard, shotty cha
enlargement, the subsidence of the fever
cles, remove all uncertainty as to its real

Prognosis.—The fatality of variola vari
The result is also markedly influenced by
of the 5 fatal cases that we met with, in a
age of five years, and 3 of them during th

The prognosis of variola must also de
which it assumes. The regular form of
favorably unless some complication happ
danger to life is greatly augmented. Wh

stage; and subsidence of the fever after the appearance of the When, in addition to these circumstances, the secondary fever o violent, and no complication arises, there is but little doubt )atient will recover.

ıfavorable symptoms are the occurrence of the disease at a very ; the existence of severe nervous symptoms during the first ie occurrence of a thick and abundant eruption upon the face, ; a probably confluent case; continuation of the fever after the ce of the eruption, or a merely slight subsidence of it; delirium nervous symptoms during the secondary fever; and any irregu-the appearance of the eruption, as paleness instead of the usual , a livid or purplish color of the pustules, imperfect development cks, or their sudden shrinking without diminution of the general s. It is scarcely necessary to say that many of these symptoms ative of the existence or threatened production of some compli-)on the nature of which must depend, after all, in great measure nosis. The complications most apt to occur have already been d in a previous article.

MENT.—We shall begin our remarks upon the treatment of the ith the following quotation from Dr. Gregory (*Tweedie's Lib. of d.*, Am. ed., vol. i, p. 332). "Before entering on the curative t of small-pox, therefore, it will be proper to recall to remem-ie peculiar nature of the disorder. It is a fever which *relieves* superficial eruption. That eruption, even when too copious, e diminished or checked in its progress by any effort of art; derate it requires not the interference of the physician." . . . . . remedies are here wholly inapplicable, and the great object of ıply to place the system under the most favorable circumstances ing what the old physicians called the concoction and elimina-ie morbid humors."

eatment of simple, uncomplicated small-pox ought, unless the confluent, to be of the mildest character. Rest in bed, light ing drinks, some gentle laxative, and an occasional foot-bath ie first stage, are all that is required in most cases. When, how-fever is considerable, and the child restless and complaining, ıdd to these means a diaphoretic, as the saline or effervescing with small doses of sweet spirit of nitre, or spiritus Mindereri; y direct from one to three drops of the antimonial wine, with ten of sweet nitre, for a child of four years old, every two hours. his produce much vomiting, or any action upon the bowels, it suspended. If the fever be violent, either during the initial later in the attack, with a full strong pulse, great heat and of the skin, severe headache, or signs of congestion of the in-gans, we should recommend the use of cold applications to the ıjoined with hot mustard foot-baths. It may also be necessary, the violent pain in the back of the neck, or in the lumbar region, either a few cups or a sinapism to these parts.

ves should be administered so as merely to secure a complete

symptoms of the initial stage disappear
the eruption.

When the eruption comes out slowly s
usual length of time in the papular stat
vesicles, the pulse being at the same tim
may hasten its appearance by the use of
balm or sweet-marjoram tea, with spiritus
covering upon the child, and by the emp
tard foot-baths, and of mustard poultice

In severe cases, attended with copio
highly nourishing, though readily diges
addition to the use of cooling drinks a
mended, the strength should be suppor
of stimulants. We would especially reco
may be given in full tonic doses with a
course of these severe cases.

The nervous symptoms which attend th
of nervous and diffusible stimuli, conjoine
to secure quiet sleep. When the period of
with symptoms of extreme debility, as fee
ness of the skin, typhoid expression of th
num, and general tremors, the treatment
tious diet, and of stimulants, as wine and
and quinia or compound infusion of cinch
doses sufficient to allay the disturbance of
lent adjuvant to the stimulants just menti
variola the above stimulating treatment
tion with the use of bark or quinia in
mineral acids, and tincture of the chloride
given in doses of a grain every hour or tw

is best, except in the case of intestinal inflammations, to moderate employment of laxatives, of small doses of sul- ony, or of one of the alkalies, in conjunction with diapho- entle counter-irritants.

o bear in mind that the increased depression caused by the al affection, usually requires the employment ultimately of orting and stimulant remedies, than are called for in un- ses.

nt of the ophthalmia which so often threatens, and some- s great or irreparable injury to the eye, must be of the kind led. In this complication the local treatment is exceed- t. When ulcerations occur upon the cornea, they ought if this be practicable, with solid nitrate of silver, sharp- , or with a fine camel's-hair pencil which has been moistened er the nitrate of silver crystal to insure a caustic solution. ossible to apply the solid caustic or the brush, we must collyrium. This may consist of a solution of nitrate of to the ounce, or of one or two grains of sulphate of zinc, r thirty drops of wine of opium, dissolved in an ounce two or three drops of either of which are to be introduced rning and evening. When the first solution is used, its d be increased after a few days to a grain and a half or two more, to the ounce of water.

ation of enterocolitis must be treated by the most careful n, the use of warm poultices to the abdomen, of emollient [illegible], and by the internal administration of astringents e of opiates. When the diarrhœa is severe, and the stools ody, we may use with advantage the nitrate of silver in enema, in the manner directed in the article upon entero-

nt of the convalescence from variola is important. The [illegible] as in other infantile and children's diseases.

uding our remarks upon the subject of small-pox, it will ive some account of the treatment of the eruption which mended and practised, with a view to prevent the scarring n which so often results from the ravages of the disease. means that have been employed with this view, there are [illegible] relied upon at present. One is to cau- ize with nitrate of silver, and the other to make a mer- on upon the part where it is desirable to cause the abor- [illegible]. The cauterization has been performed in two [illegible] the caustic to each pustule separately, or to [illegible] without puncturing the cuticle. It appears, how- [illegible] the most preferable. To succeed [illegible] the derm forming the base of the pus- [illegible] remove or lift up a portion of the top of [illegible] introduce into its interior the sharp- [illegible]. This operation is only certainly success-

of the œdema of those parts in a single
gentlemen is, that individual cauterizatio
silver does certainly cause them, as well
to abort, and prevents them from leaving

This plan is, however, manifestly inap
discrete form, where the vesicles are not

The other method which has been em
the pustules and thus prevent disfigurat
application of some one of the mercuria
this treatment are said to be an almost ce
of the eruption, when it is used from the
third day; the vesicles and pustules rem
not assuming, or else soon losing, the
applied early, while there are as yet but f
the development of new ones, and diminis
and soreness. When the application is re
day, it is found that desiccation has occ
presenting small soft scabs, or little whit
of the pseudo-membranous substance situa
the new epidermis, the old cuticle having
plaster. In some places a light rose-colore

In regard to the success of this treatme
we may quote the statement of MM. Rilliet
patients upon whom they saw it tried pre
several had had confluent small-pox, which
the parts not covered by the application.
made a considerable number of trials of th
Hospital of this city in 1841–42. He gave
ing words (*Am. Jour. Med. Sci.*, January,
experiments, it seems pretty evident that t
cided influence upon the small-pox pustules

rly in children, in consequence of the unpleasant sensations it occa- . In the second place, it not very unfrequently, according to MM. t and Barthez, produces an eruption of hydrargyriasis or mercurial la, in about eight or fourteen days after the variolous eruption, or or ten after the application of the remedy. M. Rayer, however, s this effect to be a rare one.

r. Stewardson says that he thinks no apprehension need be felt as to titutional affection from the mercury, for scarcely ever were the gums n touched. One of ourselves, however, when in Paris, in 1840, saw effect produced in a young girl at the Children's Hospital.

he method of its application is different in different hands. The nch generally employ the emplastrum de Vigo cum mercurio. Dr. wardson prefers the strong mercurial ointment, either pure or rubbed n with an equal bulk of lard, spread upon a piece of thick muslin. e muslin is to be cut into the shape of a mask, with apertures for the s, nose, and mouth. It is secured upon the face by means of strings ached to its margin and tied across the back of the head and neck. It important always for the success of the measure, that the application uld be kept in close contact with the skin. To insure this, Dr. S. ployed a separate piece of muslin for the nose, which is the part most ficult to fit. With the same view, the French authors recommend that plaster should be cut in pieces to suit the different portions of the e, making one for the forehead, and others for the cheeks, sides and k of the nose, and upper and lower lips. Any spaces that may remain to be covered with other portions of the plaster, and the whole se- ed with strips of diachylon. On account of the difficulty of applying mercurial plaster, the following ointment was compounded by the thecary of the Children's Hospital at Paris, and has been found to swer very well:

| | |
|---|---|
| ℞.—Mercurial Ointment, | 24 parts. |
| Yellow Wax, | 10 parts. |
| Black Pitch, | 6 parts.—Mix. |

The application ought to be confined to the face, as that is the part ich it is most important to save from disfiguration, and as it is better t to use it upon a larger surface than necessary, lest it might occasion mercurial roseola, or possibly salivation. As a general rule, four or e days are sufficient, according to Guersant and Blache, to leave it in tact with the skin, in order to avoid the bad effects just referred to.

The object sought in these applications being, to a great extent, to tect the vesicles from contact with the atmosphere, it has been advised paint a saturated solution of gutta percha in chloroform, over the neck d face, so soon as the papular eruption is fully out. This plan was ed in five of our own cases (*loc. cit.*, p. 345), two of which were dis- te, and three confluent, and with very satisfactory results.

passing through the system of the cow.

The proofs which exist as to the truly vari
disease in the cow, are altogether incontestal
the vaccine disease in the human subject m
fied form of variola.

It is susceptible of propagation from indivi
lation, but is contagious in no other way, an
quality of protecting, with very great, though
those through whom it has passed, against s

Besides the name given above, it is know
kine-pock, vaccina, and vaccinia.

Some knowledge of the nature of the vacci
it possesses to protect the human constitution
found to have existed in different parts of th
doubt that it is to the genius and patient res
owe the inestimable blessing of vaccination,
marvellous virtue was first demonstrated an
Dr. Jenner learned, at an early period of hi
popular belief in Gloucestershire, in England,
tracted a peculiar vesicular disease from t
thereby protected from the attack of small-po
a long course of patient observation, that this
he determined at last to try whether the disea
from one person to another, and thus increa
of this wonderful protective means. On the
ingly, he vaccinated a child eight years old
hands of a milker who had received the dise
periment succeeded perfectly, the child ha
through the disorder in the most satisfacto
July following this child was inoculated wit

benefit from its protective power which it is possible for it to rt.

first effect of the puncture by which the virus is introduced into issues, is to produce a very slight redness at the point where the tion is performed. This redness usually disappears within twenty- hours, and there is left merely a little mark or scab at the point of ion. On the third day after the operation we first begin to perceive pecific effects of the virus, in the shape of a small, hardened point at eat of the wound, surrounded by a faint, erythematous redness. Over hardened point, which grows gradually larger, the cuticle is elevated e fifth day into a vesicle, by a thin, transparent, and pearl-colored us exudation. This vesicle soon becomes umbilicated, so that by the wing day, the sixth, the depression in the centre, constituting the ilicated character, is generally perfectly manifest, and at the same the vesicle is surrounded by a very narrow ring of inflammation. vesicle continues to increase in size, until on the eighth or ninth day as reached its highest degree of development. At this stage the ves- or pock is large, usually about one-third of an inch in diameter, and rojects very considerably above the general surface. Its shape is cir- ar, as a general rule, though not unfrequently it is oval, this depend- apparently upon the mode in which the puncture has been made. color of the pock is dull white or pearly, or sometimes it has a yel- ish tint. The quantity of fluid contained in the cavity of the vesicle ers, of course, according to its size. The structure of the pock is nd, upon careful examination at this time, to be cellular, the number ells amounting commonly to eight or ten; very often there is a small, k-colored scab on the very centre of the vesicle, even at this period, ugh in other instances this is absent, the surface of the vesicle being ned exclusively of the thin and transparent cuticle. The scab just ided to has seemed to us to consist of the little incrustation, formed he point where we had introduced the virus by the drying up of the ute quantity of blood escaping after the puncture, and of the dissolved us which had not been absorbed. We have often noticed that when small scab just alluded to has been rubbed off the arm on the second , the vesicle has presented no scab as early as the eighth day. On the hth day the little ring of redness at the base of the pock, which has herto been very small and narrow, begins to enlarge so as to form the ola. This increases during the ninth and tenth days, forming a bril- nt scarlet or dark-red inflammatory circle of about two inches in diam- r, and constituting one of the most strongly-marked features of the cine disease. The color of the ring is most intense at the edge of the icle, and then fades gradually to its outermost boundary. On the ninth tenth days, in connection with the areola, the skin and cellular tissue which the vesicle is seated, and that for a short distance beyond the rgin of the latter, become hardened and tumefied, forming a solid knot lump in the derm, like the base of a furunculus. The inflammation ch causes the areola is often so intense as to occasion the production vesicles, which are almost always discoverable with the aid of a lens,

very frequently a decided febrile reactio
cases, on the contrary, none of these sym
child is gay and cheerful, its movements fr
and it seems in all respects to be in its ord

From the tenth day the disease begins
so as to have nearly disappeared by the
tained in the vesicle is gradually convert
structure of the pock is broken down so as
but a single cavity, in which the pus is co
cation is going on rapidly during this time
day the vesicle has disappeared, and in it
scab, of the shape and size of the vesicle.
for some days longer, and at the same tim
and grows darker in color, until at last i
mahogany tint. It separates gradually f
separation beginning at the circumference,
eighteenth or twenty-first day, leaving bene
heals, or else a cicatrix of the shape and si
is at first of a deep red or purple color, but
comes much whiter than the surrounding
vaccine disease is very characteristic, and
means invariably, indelible. To be at all de
disease, the scar should be small, circular,
shining appearance, and it should exhibit
sions or pits. The depressions are suppose
cells constituting the pock in its early perio

There is rarely more than a very sligh
attendant upon the course of this disease.
cided febrile reaction, attended with some u
restlessness at night, and fretfulness of the t

enomena; or, lastly, they may be such as to call in question the y of the disease, leaving us in some doubt as to whether it has pro- the constitution against variolous attacks or not.

severity of the local inflammation occasioned by the vaccination, hat of the general symptoms also, varies often to a considerable ex- In some instances, and especially when the virus employed has procured recently from the cow, the specific inflammation proves severe. We have seen the arm intensely red, and very considerably d, from the shoulder to an inch below the elbow, while at the same the axillary glands were tumefied and tender, and the child very ish and uncomfortable. This happened in three children, in all of we had employed the same virus; which, as we afterwards learned e person from whom we obtained it, had been taken quite recently the cow. It produced the same violent inflammation, moreover, in al other subjects in whom it was employed.

the vesicle happens to be broken by accident soon after its forma- its appearances during the subsequent progress of the disorder will be very different from those exhibited in subjects in whom no such dent occurs. The vesicle loses a portion of its contents; it becomes idal and irregular in shape, instead of being circular and umbilicated; es not exhibit the pearly white and diaphanous color which belongs t, but is yellowish and opaque; the areola is often premature and gular in shape, and the scab is frequently small, uneven on the edges, falls off at an unusually early period.

ccasionally there is observed in the course of cow-pox a papular erup- over the body of the child. This occurs usually between the ninth d twelfth days.

t is quite common for the disease to be retarded in its progress. The ay generally takes place in the appearance of the vesicle, this not wing itself until the sixth or eighth day, or, in some rare instances, t until the sixteenth, or even the twentieth, or forty-sixth day. The gest retardation that we have met with has been seven days. In this d of retardation, the disease usually runs through its regular and nat- al phases after the vesicle has once made its appearance. In another d of retardation the delay occurs in the vesicular and pustular stages the affection, the papule appearing at the ordinary time, but the disease t reaching its height or maturity until the eleventh or twelfth day.

The forms of variation from the ordinary course of cow-pox just de- ibed, do not seem to be connected with any diminution in the pro- tive power of the disease.

It sometimes happens that the operation of vaccination gives rise to a ease totally unlike the true vaccine disease, one which does not protect ainst small-pox, and which has therefore been called *spurious vaccine ease.*

It was formerly the custom to describe quite a variety of appearances indicating with greater or less probability a spurious disease. Of late ars, however, it is generally admitted that the spurious pock is of much s frequent occurrence than was at one time supposed, and that when

or two days by inflammation, and the
the previous production of a vesicle;
shape, yellow in color, acuminated, eas
soft, yellowish, ragged-looking crust, w
or seventh day, there is assuredly reaso
spurious, and it becomes the imperative
it as such until subsequent and repeated
have proved the child to be protected.

DIAGNOSIS.—There can be no difficult
vaccine disease when it occurs in its reg
through which the eruption passes, and
it presents in each stage, are so unlike a
small-pox, as to render it very easy of r

Sometimes, however, there is a little
the eruption is spurious or regular. But
circumstances in which we should expec
nomena of the disease, to wit, when its
effects of a previous vaccination, or of a
larities arising from these causes are s
will be described in the article on reva
the disease fails, in any important respect
of a well-marked pock, both as regard
changes, and its particular appearances
viously vaccinated, nor having had small
plan to follow is to repeat the operation
one, so as to test thereby the protective

PROTECTIVE POWER.—Though vaccinati
a means of protection against variola as it
we have always thought that those who de
way, its incalculable benefit to the human

own that the practice of revaccination somewhere about the age of y, or soon after, has almost always been sufficient to restore to the ution that exemption from small-pox which may have been more diminished after a primary vaccination performed in infancy, our ation and appreciation of Jenner's discovery cannot but be raised igher.

IOD OF PERFORMANCE.—The period usually chosen for the perform- f this operation, is soon after the age of three months. If, how- the infant be exposed to the contagion of variola, it is necessary to m it immediately, even upon the first day of life; and in such cases otective power is as perfect, and the local or constitutional irrita- ittle greater, than when the operation has been deferred to the usual

SCEPTIBILITY TO THE DISEASE.—The susceptibility to the vaccine se varies greatly in different persons and different families, and is fied to a greater or less extent by the existence of other diseases in ndividual at the moment of the operation. In some it is said never received, no matter how frequently or how carefully the virus may nserted. In others it is received with difficulty, requiring several titions of the operation before it can be made to take; whilst in yet her class of subjects, the smallest amount of virus, when inserted in reless and imperfect manner even, will produce the disease with the itest certainty. It may be safely asserted, however, that a large ority of children take the disease after a single operation, if this be formed with ordinary care and nicety. No explanation of the differ- susceptibilities of individuals to the disease can be given. The same erence is known to exist in regard to other contagious and even epi- nic diseases, as measles, scarlatina, pertussis, variola itself, typhoid er, and cholera.

he susceptibility varies also in the same person at different times, hout its being possible to ascribe this fact to any evident cause, since child may appear on both occasions to be in the same condition as to lth and other circumstances likely to influence its susceptibility to the tagion. Thus, we knew a child a few months old to be vaccinated r times, twice by the late Dr. C. D. Meigs and twice by one of our- ves, each operation following rapidly the preceding one, without suc- s, though the virus was known to be good from its having succeeded other subjects, and though it was changed each time. The child ap- red to be in perfect health. There was no eruption of any kind upon surface, nor any other condition that could explain its insusceptibility. er the fourth operation, the attempt was suspended for about four nths, then renewed, and with instant and entire success. In another e, the varying susceptibility of the same individual to the disease was l more strikingly exemplified. An infant, a few months old, was vac- ated four times in succession from the scab without success. It was n vaccinated with fresh lymph taken from the arm of an infant who s undergoing the disease. This also failed. A few weeks after this,

been merely retarded when the operation was performed
tial stage of the eruptive fevers, whilst its course was susp
entirely when any of these affections occurred in a child
ated, to be resumed again after the cure of the eruptive fever.

There is another circumstance concerning the supposed eff
diseases on the vaccine affection, to which it will be well
tion. We are sure there are few practitioners, having any
amount of business, but must have been annoyed, and injured
their reputations, by the notion so prevalent in the commun
cination may impart to children other diseases. This prej
particularly in regard to the chronic cutaneous eruptions of
childhood, so that we have frequently had parents to insist
impetiginous or eczematous disease under which their chil
laboring, has been caused by the vaccination, performed perhaps
or even months before. M. Taupin, quoted by MM. Guersant
(*Dict. de Méd.*, t. xxx, p. 414) vaccinated a large number of
the Children's Hospital in Paris, with virus taken from subjects
with itch, scarlatina, measles, varicella, varioloid and vari
scrofula, tubercles, chronic eruptions of the scalp, dartres, &c.
communicating to the patient any of these affections, either
knowledged contagious or non-contagious nature. A very
illustrative of this point is mentioned by Dr. Gregory in his "
*the Eruptive Fevers*" (Am. ed., New York, p. 270). "A child
been exposed to the infection of small-pox, was vaccinated.
eases advanced. A lancet charged with lymph from the vacci
produced cow-pox. Another lancet charged with matter from a
pustule, *formed within the vaccine areola*, communicated
We mention the result of these experiments in order to show
foundation there is for the popular notion above alluded to,
to the practitioner an argument with which to defend himself

And there are well-authenticated cases in which the operation oubtedly been followed by this terrible result. In every instance, r, so far as we are aware, in which the exact mode of the vaccina- ld be ascertained, it has been found either that the child from he virus was obtained, presented at the time evidences of constitu- yphilis, or that the virus had been impure, being mixed with blood which may have been the medium of infection. There is, indeed, dence whatever to show that the lymph or crust derived from a typi- cine eruption, in an apparently healthy child, can possibly be the of transmitting any constitutional disease. It is more prudent, er, that if the lymph be used, it should not be taken after the eighth the existence of the vesicles; and that in obtaining it, all hemor- should be avoided.

RATION.—The form in which the virus is introduced, varies accord- the practice of individuals.

lymph may be inoculated from arm to arm, though of course this is but rarely available, or the lymph may be taken from the vesicles e the eighth or ninth day, and preserved on ivory points, or in sealed ary tubes.

this city, however, the crust is usually employed, and has been found ely efficacious and satisfactory. As, however, there is more danger nploying inactive or impure virus in this form, than when lymph ed, it is necessary to be assured that the crust has been obtained a typical case of vaccine disease in a healthy child, and that it d present certain physical characters. Thus the crust should be and brittle, slightly translucent, of dark, yellowish-brown color, and der surface should usually present little depressions and ridges cor- nding to those described on the cicatrix.

ferent methods of inserting the vaccine virus have been employed fferent practitioners. The two methods most frequently resorted to ose by incision and puncture. The former consists in making a ficial incision of several lines in length into the skin, in such a way cause a very slight effusion of blood. Into this is introduced a quantity of a dried vaccine scab reduced to a fine powder, or a of fine thread wet with the vaccine fluid or with water holding in nsion a portion of dried virus. Over the wound is then placed a of isinglass plaster, which is secured by a bandage. This is to be ved after two or three days, and the disease allowed to pursue its ar course. The operation by puncture is performed by introducing ontally beneath the skin a needle or lancet charged with the virus, hen withdrawing it in such a way as to leave the virus in the wound. ese two modes the latter is the one now most frequently adopted, rmer having been found to occasion, not unfrequently, a spurious se, and to be of very difficult application in the cases of children. ur own part we have used for some years past a method that we have much the most convenient in children, and which rarely fails when arefully performed. We take a common thumb lancet, which should e too sharp. Holding the arm of the child with our left hand, and

cine fluid or dissolved [illegible] and slightly exposed. On this
it, and the nurse should be told to leave the arm bare and
twenty minutes, or until the applied fluid has dried into
when no further precautions are necessary. This mode of
at first seem tedious and painful. We can only say that
gently and gradually, it causes so little pain that we have
it upon sleeping children without waking them.

It was at one time thought necessary to make several
order to insure a successful inoculation, some making two,
many as five; and it appears from statistics on this point,
sequent mortality from variola is in an inverse ratio to the
vaccine cicatrices.[1] In this city one only is generally made,
to answer every purpose. When, however, there has been
in making the child take the disease, we have on several
ceeded better by making two insertions, one being situated
inch or an inch below the other; nor have we found that the
mation or general symptoms have ever been severe enough to
to regret this mode of operating.

The place usually selected for the operation is, as every one
the arm, close to the insertion of the deltoid muscle. This is the
as a general rule, and particularly in girls, whose parents often
having the insertion made below this, lest the scar should be

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[1] The protective power of vaccination, as well as the influence exerted
fection and the number of the insertions, as shown by the cicatrices,
well exhibited in the following table quoted by Dr. Seaton (Art. Vaccination,
nolds's Syst. of Med., vol. i, p. 499), from Mr. Marson. The table is
15,000 cases. Of these it was found that the unvaccinated died at the rate
cent., and the vaccinated at the rate of only 6½ per cent.

| Classification of Patients affected with Small-pox. | Number of Deaths per [illegible] in each class [illegible] |
|---|---|
| 1. Unvaccinated, . . . . | |
| 2. Stated to have b | |

ars, when the arm is uncovered. In boys we often select the radial the forearm some two inches below the elbow, since in this place k is least apt to be injured in the act of dressing the child, or of t about.

### REVACCINATION.

the prophylactic influence of a primary vaccination is diminished, some instances entirely lost, by the progress of time, has been ositively and clearly shown by the observations of latter years. ve the truth of this it is merely necessary to state, that almost all writers on the vaccine disease recommend a recourse to revaccina- ome years after the first operation. With the view of bringing this r fairly before the reader, we will quote the opinions expressed by of the leading authorities of the day.

Gregory (*loc. cit.*, p. 346) says: "The practice may be recom- ed for its safety, even if it be much less serviceable than the Ger- contend for. We have sufficient facts before us to state that it need r be recommended prior to the tenth year of life, and that the age fitted for it is from the period of puberty to that of confirmed man- ." Guersant and Blache (*Dict. de Méd.*, 2ème ed., t. iii, p. 435) have ked their first opinion that revaccination was unnecessary, and state they now believe firmly "that the protective power of vaccination mes enfeebled and does not preserve the individual from contracting ola in a more or less favorably modified form; and that in consequence ccination ought to be zealously recommended and propagated." The demy of Medicine of Paris, consulted by government upon this ques- some years since, determined that revaccination was unnecessary. ebruary, 1845, however, the same learned body, after reconsideration he matter, arrived at different conclusions. Two of these we shall te. "Revaccination is the only method of proof which science pos- es of distinguishing persons who have been definitely protected by ination from those who are so only in various degrees."

The trial by revaccination does not constitute a certain proof that e of the vaccinated in whom it succeeds were liable to contract ola, but only a tolerably strong presumption that it was amongst them icularly that the disease would have been apt to occur. In ordinary ods revaccination ought to be performed after the fourteenth year of when the disease is epidemic, it is prudent to resort to it earlier." ersant and Blache, *loc. cit.*, p. 436.)

M. Rilliet and Barthez say (t. ii, p. 538): "The diminution of the ective power of vaccination, after a certain number of years, seems to ositively proved, but it is proved also that this diminution is almost ing during the period of life which concerns us." Dr. Condie says . *of Children*, 2d edit., p. 466): "If, therefore, the facts upon record perfectly accurate, and there is no reason for suspecting them to be rwise, they afford conclusive evidence of the necessity and importance vaccination, in all cases in which persons are liable to be exposed to infection of small-pox." It is scarcely necessary to remark that all

possibly of saving the life of the individ
preventing the spread of small-pox, and of ultimately era
not from the globe, at least from extensive communities."

We might quote, in further proof of the propriety and
revaccination, many other evidences emanating from vario
with the following short account of our own experience
we shall bring our remarks to a close. In the year 1845
cinated 63 persons, of whom 9 had the disease with every
regularity; that is to say, the puncture did not become irrit
third or fourth day, the vesicle was perfect on the ninth,
cated centre, hard base, and scarlet areola, and after that
flammation subsided rapidly. Of these 9, all but one had
cicatrices of previous vaccinations on the arm. The ninth
but the individual insisted that he had been properly vaccinat
remaining 54 cases, the great majority presented more
marked signs of the disease. In nearly all a yellowish pustule
some time during the second day, which was surrounded
patch of redness of small extent, presenting often a dotted
look. In some the appearances promised a regular vaccine
several days, but terminated suddenly by the drying up of
and the formation of an ill-shaped acuminated scab, which
leaving a slight scar quite different from that of a primary

The only remaining point for consideration is the period of
revaccination ought to be performed. The prevailing opini
be, that somewhere about puberty is the most suitable time,
cases of children exposed immediately to the infection of
when it may and ought to be resorted to at a much earlier peri

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## ARTICLE V.

known also in English by the names of chicken-pox, swine-pox, stalli.

ral different forms of the disease have been described by different under the titles of lenticular, conoidal, and globular; but inas- as these varieties are of no real importance in practice, we shall advert to them casually in our account of the eruption.

SES.—Varicella is propagated in two ways; by *contagion*, and by *ic* influence. That it is contagious there can be no doubt, since all observers agree upon this point. In our own experience we have n known any child, who had not had the disorder previously, to e it when once it has entered a household. It rarely attacks any hildren. Its epidemic nature is shown by the fact that in some sea- it is scarcely seen, whilst in others it prevails extensively over large cts of country, and attacks many children in the great towns and of those districts. Varicella occurs only once in the same individual.

nsiderable discussion has taken place at various times as to the real re of varicella, some asserting that the disorder is merely one of the ties of modified small-pox, while others maintain as strenuously that an independent and specific disease. The weight of authority, how- , seems to be clearly in favor of the last-mentioned opinion, and we no hesitation in avowing this to be the conclusion to which our own ling and experience has brought us. When we consider, indeed, that cella is, unlike either variola or varioloid, incommunicable by inocu- on, that it attacks indifferently the vaccinated and unvaccinated, that course is entirely unaffected by previous vaccination, and that the cine disease is readily taken, and passes through its regular phases r varicella, we do not see how we can refuse to believe that the latter omething entirely independent of small-pox, and therefore a distinct l peculiar malady.

YMPTOMS; COURSE; DURATION.—The eruption is usually but not al- ys preceded by prodromic symptoms. These seldom last more than , or at most two days, and consist at the very beginning of slight chil- ess, or of a chill even, which is followed by a more or less marked rile reaction. In some instances there is vomiting, but this is rare, l when it does occur, slight. When fever exists it is marked by head- e, accelerated pulse, slight warmth of the surface, pain in the back l limbs, languor, indisposition to play, some unusual irritability of per, diminution or loss of appetite, and unusual thirst. These symp- ns may be present, and yet in so mild a shape that the child shall show disposition to abandon its ordinary habits of activity and play, while other cases again, there are literally no initiatory symptoms whatever, d the appearance of the eruption is the first declaration of the presence the malady. Even when constitutional symptoms are present, they ually disappear by the third day.

The eruption appears in the form of small papular spots, of a deep red lor, and irregularly circular shape, which generally show themselves t on the front and back of the trunk, and extend very soon to the face, d a little later, to the extremities. We have known a child to go to shape, constituting the conoidal and glob forms of Willan and Bateman. We deem it unnecessary, as to describe different varieties of varicella, since this is practical purposes, and because we constantly see upon the vesicles of very different shape and size. When fully vesicles are often of very considerable size,—two or three eter; they contain a transparent fluid, which is either or of a faint orange tint, and some of them are surrounded ring of inflammation. On the third day, the eruption contin the same state as on the second, except that the fluid conta the vesicles assumes a yellowish appearance, owing to its pas the serous into the purulent condition. On the fourth day desiccation begins and goes on rapidly, the vesicles that have broken by accident, or torn by the fingers of the child in appease the itching which they give rise to, assuming a shr shrunken appearance at their margins. As this process vesicles are gradually converted into light brownish scabs, sixth day they are nearly all dried up. The scabs are usually dry from the circumference to the centre, and between the ninth day fall off, leaving behind faint red spots, not depressed general surface, and which soon disappear.

The eruption is generally accompanied, as was stated above, sation of heat and itching in the vesicles, which causes the and scratch them in such a way as often to break those whi reach, and thus prevent them from passing through the regula of maturation and desiccation.

Diagnosis.—There is but one disease with which varicella confounded, and that is variola in some of its shapes. With small-pox such a mistake could scarcely happen even to the enced. With varioloid, on the

TMENT.—In a large majority of the cases, varicella requires no ent beyond attention to diet for the first two or three days, and the nce of cold during the convalescence. When the constitutional oms are marked, the fever and headache being considerable, a dose e mild cathartic, a little sweet spirits of nitre in cold lemonade or ade, rest in bed, and one or two foot-baths, will be all that is neceso reduce these symptoms and make the patient comfortable.

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## ARTICLE VI.

### TYPHOID FEVER.

is only of late years that the frequent occurrence of typhoid fever oung children has been fully recognized by medical authors. From date of the publication of the classical work of Louis on this disease, l the year 1839, it appears to have been the almost universal belief it was an affection limited to adult life; and with the exception of a brief and vague descriptions, which evidently referred to this dise, though other names were used to designate it, medical literature tained no account of typhoid fever as it occurs in childhood. In the er part of 1839, however, Rilliet (*Thèse de la Faculté,* 1840; and *ladies des Enfants*, t. ii, pp. 663–739) and Taupin (*Journal des Conissances Méd.-Chirurgicales*) published separate and independent meirs on this subject; and since that time the occurrence of typhoid er in children has been frequently observed and very carefully studied. The fact that it was so long overlooked, is undoubtedly to be explained, great part, by certain peculiarities which the disease presents in chilen, which caused its real nature to be mistaken, and led to the applican of other names.

Of these names, that of infantile remittent fever was the most freently used, and though this term was made to include a number of er diseases, and although remittent fever does occur in children, there n now be no doubt that a large proportion of the cases so styled, were reality cases of typhoid fever.

CAUSES.—*Age.*—Typhoid fever has been observed during the first year life, but is rare under the age of two years. It is comparatively freent between the ages of three and eight years, and it attains its maxim of frequency in childhood between the ages of eight and eleven ars.

*Sex.*—The statistics of most authorities show a preponderance, more less marked, of cases occurring in boys. In some series of cases this sparity has been remarkable (three to one); but, notwithstanding, it is obable that in a very extensive series the difference would be comparaely trifling.

*Contagion.*—It can scarcely be doubted that typhoid fever is occasion-

ked in those nearest minent. Injected
however, these glands ulcerate, the softening beginning
face, and extending more and more deeply, or beginning
portion of the patch, so that the superficial layer may be
slough.

These ulcers thus destroy the mucous membrane, and
mucous or muscular coats for their base; or, in some instances
ative process may extend through the muscular and even
peritoneal coats.

According to Rilliet (*loc. cit.*), however, these ulcers are
forming, smaller, and less numerous and deep in children
and, indeed, he believes that in not a few instances the swelling
flammation of the gland may undergo resolution without the
of ulceration.

Too much importance must not, however, be attached to
ment, since it appears to us evident that a few cases, at least,
fever are included amongst those upon which his memoir is based.

The solitary glands are, in the early stage of the disease,
may be distended with a serous or more thick and yellowish
as to resemble vesicles or even pustules. Later in the attack
cous covering is destroyed, and small, round, or oval ulcers, with
edges, remain. These ulcers are also most numerous in the
of the ileum, though in some cases they are met with quite
in the large intestine.

The mesenteric glands are enlarged, softened, and strongly
the change corresponding in intensity to that of the agminate
the ileum, and being most marked in those glands which are
ileo-cæcal valve. Usually the swelling of these glands subside
suppuration occurring, but occasionally this ensues, and
converted into an abscess with thin
The cicatri

in cases where the most violent nervous symptoms have been , the brain rarely presents any more positive lesion than mere tion of the vessels of its membranes and substance, with at times ubarachnoid effusion. In some cases where death has occurred some after the termination of the fever itself, but where cerebral symp- have persisted, tubercular meningitis has been found, and it has hought that the irritation of the brain during the fever was the ex- cause in a system strongly predisposed to a tubercular develop- .

MPTOMS.—The general course of typhoid fever is much the same in en as in adults.

resents also the same wide variety in its type and degree of severity, ding upon the predominance and excessive development of some f the elements of the disease; and it would be easy, therefore, to le the disease into a great number of forms, according to the promi- e of each functional disturbance; but as our object is merely to give actical description of the disease as met with in children, we will, in idering its course, give a brief sketch of an ordinary case, and then ll in detail upon certain symptoms which require special notice, as enting peculiarities in childhood.

n the majority of cases, the attack is preceded for some days by slight dromes; the child, who ordinarily may enjoy robust health, appears guid, and is easily tired, and indisposed to play; he loses his appetite, estless during sleep, and possibly may complain of colicky pain in the lomen, perhaps attended with slight looseness of the bowels. After this te of vague indisposition has lasted from three or four to eight or ten ys, more decided symptoms manifest themselves, and the attack may said to fairly begin.

More or less febrile action now appears; but this is rarely continuous, d for the ensuing five or six days there are distinct and marked remis- ons, usually in the morning, but sometimes so marked and prolonged at it is only towards night that the skin becomes heated, the pulse fre- ent, and the child grows restless, while, during the day, he has merely peared somewhat dull and languid. The loss of appetite continues, d becomes more complete, though thirst is marked; vomiting is apt to llow eating, and is sometimes frequent and spontaneous; the tongue resents a moist, whitish-yellow fur in the centre. The bowels either ontinue loose, or now become so for the first time; the abdomen be- omes somewhat large and tympanitic, and slight tenderness may be resent in the right iliac region towards the close of the first week.

The strength is rapidly lost, and the child, after the first few days, hows no desire to leave the bed. The respirations are somewhat hurried, nd are often accompanied by sonorous râles and slight dry cough. The ulse is accelerated, but rarely rises at this stage above 110.

The expression grows dull and listless, unless temporarily excited uring delirium, and the child takes but little notice of surrounding per- ons or objects. During the night there may even now be a tendency to

temperature ranges in
from 102° to 105°; it may still present, however, decided
missions, and it is not rare for profuse warm perspiration
out having any critical value whatever. The pulse becomes
quent, 120, 140, even 160, and at the same time smaller and
The respirations are also more hurried, and, when the pul
plication is marked, may be very rapid and shallow, and
quent and annoying; in such cases, auscultation reveals,
the postero-inferior part of the lungs, abundant mucous,
râles. The vomiting ceases, and the child will usually take
food offered it; the tongue becomes more heavily furred,
dry and brownish in the centre, though it often remains
lowish-white throughout. Thirst is apt to diminish, owing to
the perceptions, but the child will frequently drink greedily
if offered to it. The diarrhœa persists, however, and the
yellow and fluid; the belly is more tympanitic, and may be
tended. The discharges, both of urine and fæces, are often
and the child does not even appear conscious of them. The
colored and scanty. The eruption continues and becomes
dant, the spots which appeared passing away and being followed
sive crops. Sudamina are also frequently present, especially
ing occurs. The mind becomes more and more dull, though
always possible to rouse the child by speaking loudly to it;
usually present, especially in the night, and manifests itself
children by restlessness, sharp, unmeaning cries, and a wild
of the face, and in older ones by muttering, or even by attempts
the bed. Irregular muscular movements, such as floccitatio
tus, are rarely noticed; though at times these, and even spasmodic
of the trunk or limbs, or convulsions, may be present.

We have thus sketched the course of what is, perhaps, the
mon form of typhoid fever in children, where the disease begins
ally, and either remains mild throughout, or assumes a more

utters sharp cries, or, if older, talks incoherently. The pulse and
tion are much accelerated, and the temperature of the surface
rises, till, by the end of the first week, it may reach 103° or
The cerebral disturbance may mask the presence of any abdominal
and as it is not unusual for the bowels to be quiet for the first few
the case may closely simulate some acute cerebral disorder. By
d of the first week the disease is developed in its full severity. The
is more nearly continuous, the morning remissions being compara-
slight, and the skin remains constantly dry and hot. There is deep
r, from which the child is roused only with much difficulty, and which
ionally alternates at night with restlessness, jactitation, and noisy
um. The pulse is very frequent and feeble, and the breathing ac-
ated, and usually accompanied with bronchial râles. The vomiting
s, but the abdomen becomes tympanitic, and there is more or less
dant diarrhœa; the stools are often passed quite involuntarily, and
urine is either retained or dribbles away unconsciously. Epistaxis
rs in a large proportion of cases, and about this time the character-
rose-colored eruption makes its appearance. During the second
k all of the symptoms become more grave, and the patient may suc-
b to the violence of the disease, or remain for a week or ten days
ged in profound stupor, with subsultus and marked muscular tremor;
n the lips and teeth coated with sordes, the tongue tremulous, dry, and
ted with brown crusts, the abdomen tympanitic, and the stools frequent,
n, and passed involuntarily; with the pulse running, feeble, from 130
160 in the minute; the respirations shallow, imperfect, and attended
h subcrepitant râles, indicating passive congestion of the lungs; with
urine retained, dark-colored, and even albuminous; and yet gradually
erge from this apparently hopeless condition to enter upon convales-
ce about the close of the third week.

n favorable cases, between the fifteenth and twenty-first day, the grave
nptoms begin to abate. The child's expression becomes more natural,
l often the earliest sign of approaching convalescence will be the ap-
rance of a smile of recognition, or of pleasure at the consciousness of
provement. The fur upon the tongue becomes looser, moister, and
gins to separate, and the appetite slowly returns; the distension of the
lomen diminishes, and the stools are again passed consciously and vol-
tarily, and gradually assume a healthy appearance. Restlessness and
irium disappear, and the sleep becomes quiet and refreshing; the fever
bsides, and the temperature falls, and again shows a marked difference
ween the morning and evening. The child thus passes into a state of
nvalescence, which, when not disturbed by complications, is quite rapid,
ugh attended with marked emaciation, extreme debility, and feeble-
ss of digestive power, with a tendency to intestinal disturbances. In
ne rare cases, at times without assignable cause, at others from im-
per exposure or exertion, or indiscretions in diet, the patient suffers
elapse, the original symptoms reappear, and a second fully developed
ack of typhoid fever, attended with marked nervous symptoms, charac-
istic eruption, and diarrhœa, may ensue.

an, the res

ical examination frequently reveals
or hypostatic pneumonia. Vomiting
be frequent and distressing; the belly
frequent, involuntary, and at times
subjected to pressure, and death ens
signs of extreme pulmonary obstructi

At other times death occurs not so
the disease itself as from the develop
tions which will be mentioned hereaft

SPECIAL SYMPTOMS.—Although, as
of typhoid fever is much the same in
few symptoms which require more detai
ties which impress special features upo
hood.

*Prodromes.*—In children, as in adult
preceded by a marked prodromic stage,
of health to the fully developed diseas
duration of these prodromes varies from
least in the more severe cases.

*Fever.—Condition of Skin.*—We hav
early stage, there are apt to be very ma
action lasting even throughout a consider
bations of the fever usually occurring t
that in some few instances two distinct re
be noticed in the course of every twenty-
which gained for the disease the name of
caused it to be ranked with the malarial di
the second week, however, the remissions b
temperature, which in some cases reaches
ing a somewhat

hout the course of the disease by a thick yellowish-white coat, nay remain moist and loose, or in very grave cases, becomes dry ownish. Sordes are not often observed. Vomiting, which is per- ot more frequently met with in the early stage in children than in may be very frequent and persist until far into the second week. majority of cases, diarrhœa is either present or the bowels are arly sensitive to the action of laxatives. In some cases, however, pecially those where vomiting is marked, constipation of a quite ate form is present. The conjunction of these two symptoms, in ction with the cerebral symptoms present, may cause the case to gly resemble the first stage of tuberculous meningitis; the doubt however, be usually resolved by careful examination, as will be fully alluded to under the head of diagnosis.

e stools, when diarrhœa exists, are ochre-colored, fluid, and on stand- leposit a sediment of shreds of mucous membrane, epithelium, and ally digested food. Mucus is rarely present; but blood, in varying ınt, may be mixed with the fecal matter. When the amount is large, usually due to the ulcerative process in the intestine having opened ssel of considerable size, and then constitutes a very grave complica-

young children it is difficult to establish the existence of abdom- pain, but, when they are capable of describing their sensations, ky pain is frequently complained of in the early stages; and even in youngest children, pressure in the right iliac region may often be ı to be painful.

ympany is usually present at some time during the attack, especially en there is diarrhœa. Even when the bowels are confined, however, abdomen is never retracted. Rilliet states that, in some grave cases, observed such great tympany that the abdominal walls were thin ugh to allow the outlines of the convolutions of the intestine to be rly seen.

nlargement of the spleen nearly always exists, but frequently to so ht a degree that it cannot be readily detected either by palpation or cussion, and even when considerably enlarged, it is apt to be entirely den by the distension of the abdomen.

he *urine* presents the ordinary febrile conditions, being scanty, high- red and of high specific gravity; the pigment is increased, and the orides much diminished.

he stools are, as we have already said, often involuntary during the ght of grave cases, after the beginning of the second week. Until this e, however, and throughout the entire course of more mild cases, the ld is conscious of the desire, and can control the passage, or even hes to be taken from the bed for the purpose.

he urine is also, though more rarely, discharged involuntarily; in rare es, which may ultimately recover, retention of urine is present, and is grave import. Rilliet never observed this symptom, but we have seen nore than once, and especially in a boy aged five years, who required heterization for several days successively, but who finally recovered.

degree. Extre
ations in its character and rhythm,
where the pulmonary obstruction see
system is profoundly disturbed.

The *pulse* is accelerated from the
the disease, rises to 120, 140, or even 1
In grave cases it may become extrem
but scarcely ever is intermitting or ir

The *eruption* of typhoid fever in ch
appearances as in the adult; it usually
the abdomen, and often presents sever
more frequently absent entirely, and pre
to the date of its appearance, in them tha
eruption certainly bears no relation wha
and in a varying proportion of cases (
daily examination fails to detect the ch
the case. The eruption makes its appea
between the sixth and twelfth days, but
so late as the twenty-fifth day (Hillier),

Sudamina are frequently present in
the ninth day.

*Epistaxis* is very rarely abundant, bu
cases at some period after the third day.

*Nervous Symptoms.*—In none of the sy
variety observed as in those furnished by

In mild cases, consciousness is retained
pression of the face is stupid and heavy; t
doze during the day, but becomes feverish a
sleeps uneasily and wakes frequently.

In more severe cases, the nervous sympt
The face assumes an almost characteristic
and vacant, or bright and excited du
present

week, but then may become violent, the child crying out loudly, ering incoherently, and struggling violently to leave its bed. The n is rarely continuous but is most marked during the night, being d during the day by more or less profound stupor, which, however, amounts to actual coma.

ultus, and carphologia, as well as muscular rigidity, are compara- rarely observed in children, and only in very grave cases. Con- is, even of a general and violent character, are met with in a very proportion of cases; they may occur in the early stages of cases subsequently recover, or as one of the final phenomena in fatal They are, however, at whatever stage they present themselves, of grave import. In a case mentioned by West, the convulsions re- l on two successive days at the middle of the third week of the and were succeeded by hemiplegia, which continued, though gradu- iminishing, for four days. The child was unconscious even before occurrence, and continued so for several days, though he eventually ered.

a general rule, the course of typhoid fever is much less apt to be ded by any *complication* in children than in adults; there are, how- some which occur with considerable frequency.

e have already stated that cough and signs of slight bronchitis are ent in the early stage. In a considerable number of cases these ptoms become aggravated as the case progresses, and there may development of general bronchitis, or even pneumonia; more fre- ntly, however, the condition of the lungs is rather one of hypostatic gestion than of true inflammation. These complications, when present marked degree, protract the case and add greatly to its danger. risy is comparatively rare.

erforation is more rare in children than in adults; but when present s rise to the same symptoms, and leads to an equally rapidly fatal lt. In some cases, its occurrence is announced by an attack of con- ions (Rilliet).

testinal hemorrhage, on the other hand, is comparatively frequent; Hillier observed it four times out of thirty in which the stools were fully examined. It is usually of grave significance, but is at times in mild cases, which recover readily.

arache is not infrequently observed after the height of the disease; me cases it is followed by abundant purulent discharge.

flammation of the parotid gland is much less frequent than in adults, also phlegmasia alba dolens, of which, however, there are instances ecord.

here is very little tendency to the formation of bed-sores in children, with care in the management of the patient, they will scarcely ever r. In some epidemics, gangrene of other parts, as of the vulva or k, have been observed in a few instances. Angina, and occasionally do-membranous laryngitis have also been noticed.

e have seen that the urine is at times albuminous, and in these cases e is undoubtedly an intense congestion of the kidneys, which in very children, presents such marked remissions, as to have led to apply the name infantile remittent fever to the disea- bear in mind, however, that it is far from being rare for the element to be present, complicating the case, and constituting malarial fever.

During the height of the disease, it is rare for any of the tive fevers to make their appearance; but during convalesc- rubeola, and scarlatina, have all been occasionally observed and run through their regular course.

Tuberculosis is by some regarded as one of the most freq- quelæ of typhoid fever in childhood; and in some cases, it looks as though the extreme debility of constitution induced by favored the development of tubercle in children with hereditary position. It is probable, however, that in some cases also the of acute tuberculosis has been mistaken for typhoid fever, and will be more clearly pointed out, it possesses some strong resemblance.

Convalescence.—The convalescence is, as in adults, tedious certain. The child often remains for many weeks in a state of debility, and with such extreme nervous exhaustion, that hysterical symptoms may even be present.

The digestive system also manifests this debility in a marked degree, and it requires the greatest tact and care to encourage to eat and, at the same time, to regulate the diet, since the slightest cretion will serve to excite serious symptoms. Not rarely there many weeks after the termination of the disease itself, in a tense emaciation, the child being worn out by persistent diarrhœa resists all change of diet and treatment.

We have already alluded to the fact, that occasionally re- been observed, either without cause or following some trivial tion, in which the symptoms of the fully developed disease peared and gone through their regul or have lately passed through some one of the eruptive fevers, or of hooping-cough; and sence of eruption and the greater duration of the case.

Usually, however, there is a sufficient ground for diag- by the special symptoms, even early in the course of the typhoid fever the vomiting in the early stage is rarely in nate, and only follows eating; and, though the bowels may be for a day or two, diarrhœa soon makes its appearance, and begins early to enlarge. In acute tuberculosis, on the other vomiting in the early stage is usually both frequent and occurs entirely causelessly; whilst the bowels are in most pated, and the abdomen retracted until a much later period when the disease of the mucous membrane excites diarrhœa proach of fever in the tubercular disease is more slow, regular, and its degree less intense, as a general rule, than fever.

The nervous symptoms in the early stage may be almost before long, in cases of tuberculosis, some of the unmistak tubercular meningitis, such as strabismus or partial paralysis pear. Epistaxis is rare in tuberculosis, and of course the eruption of typhoid fever is absent, though it must be borne this is not constant in the latter disease. And, finally, the monary disease may in some cases be slight and not revealed tive physical signs, most important aid is often derived from exploration of the chest.

**Treatment.**—Typhoid fever in childhood requires the same plan of treatment as in adults. In mild cases little else is strict attention to all hygienic precautions, and a supporting and digestible diet. Whatever complications ensue, should treated appropriately. There are, however, a few indications to which it may be well to speak more in detail.

When the fever is high, febrifuges, such as liq. ammoniæ sp. ætheris nitrosi

During convalescence, the utmost care gard to food and exercise. Solid food shou and with much caution; beginning with t forms, and watching the manner in which

In those cases where the child remain extreme debility, with impaired power of iron should be given, if the stomach will to bathing, change of residence, and the ut rules, are also to be recommended. Whe the development of tubercular disease, t out with the greatest assiduity; and, if t oil may be given with advantage.

# CLASS VII.

## DISEASES OF THE SKIN.

### INTRODUCTORY REMARKS.

' will be observed that, in regard to some of these affections, we have red the arrangement which was adopted in the last edition of this book, le retaining the same general divisions of skin diseases: rashes, pap- ., vesicular, pustular, and squamous affections. For although none he new classifications recently devised, some of them based upon the tomical element of the skin affected, others upon the nature of the hological process present, and others still upon the clinical relations the various diseases, appear to us completely satisfactory; still the re rigid study of skin diseases has rendered necessary the removal of umber of eruptions from the classes where they were formerly placed. e follow then the example of Wilson, who retains the original clas- ication of Willan, modified and expanded, however, so as to harmonize th the results of more recent observations.

The class which will be found to have been most changed, is that of sicular diseases, of which eczema, a disease formerly defined to be aracterized by the presence of vesicles, was the type. It was long ago ident, however, that this was not a strictly correct definition, since in any cases of eczema, other elements of eruption besides the vesicles were esent. And, accordingly, the term eczema is no longer restricted to a rely vesicular eruption, but is erected into a generic title for all affec- ons which are characterized by redness, itching, infiltration of the skin, udation on its surface, and the formation of crusts, whether the ele- entary lesion be an erythematous rash, a papule, a vesicle, or a pustule. accordance with this, as will be seen more in detail under the head of zematous affections, this class includes many cases of some affections, impetigo, which were formerly classed among the pustules, and of hers which were included among squamous diseases.

It would be worse than useless in a work like the present, which is cessarily restricted within certain limits as to size, to attempt a full scription of all the diseases of the skin to which children are subject. ch a course would compel us to devote to more important matters than e affections of the skin, a much smaller proportion of space than they quire and deserve. We shall therefore select only those cutaneous dis- ses occurring in early life, which are most important either from their equency, or because they present in children some particular aspects or culiarities, which make it necessary that they should be studied sepa-

# CHAPTER I.

## RASHES.

### ARTICLE I.

### ERYTHEMA.

**Definition; Frequency; Forms.**—Erythema is a non- antheme, characterized by a slight and superficial redness of pearing in patches of irregular form and uncertain extent. may not be preceded by or attended with signs of constitution It is quite a *frequent* affection in some of its forms.

We shall describe three *forms* of the disease, restricting we have already said that we should, to those which seem important in infancy and childhood. These forms are *Ery Erythema Intertrigo*, and *Erythema Nodosum*.

**Erythema Fugax.**—This form of erythema occurs chiefly in of various acute internal inflammations, and especially those during dentition. It may occur during high febrile reaction by any cause, especially in children having an active cutane tion. We have observed it several times in the local inflamm companied with great disturbance of the circulation, and par a case of severe catarrh occurring during dentition, and in severe simple angina. In these cases it appeared in the form red rash, resembling very much a mild scarlatinous eruption. seated upon the upper part of the front of the thorax, and upon surfaces of the arms. The red flush disappeared readily under and flashed back under some kind of sickness, which is not generally the case rlatina; by the less scarlet tint of the eruption, its more superficial r, and more limited extent; and lastly, by its short duration.

HEMA INTERTRIGO.—This form of erythema was for a long time, till by some, known by the single name of intertrigo. It occurs portions of the body exposed to friction by the contact of opposite , and to irritation from the passage over, or retention upon them, rinary secretion or the fecal discharges. The most common seats e, therefore, in the folds of the skin about the neck, in the axillæ, ins, about the anus, in the cleft of the nates, and on the inside of ghs.

t appears in the creases of the skin about the neck, or in the axillæ, be a mere red blush lasting a few days, and then disappearing; er presenting this appearance for a short time, the inflammation ecome much more intense, and occasion an excoriated condition of rfaces attended with the discharge of a serous or a sero-purulent or, lastly, the inflammation may run into veritable ulceration, giving o extensive and very painful ulcers occupying the depth of the crease, nting abrupt and jagged edges, and discharging very considerable tities of pus. In these latter forms of the eruption it must be re- ed as a true eczema, and, indeed, this form of erythema has been by authorities transferred to the group of eczematous affections, under ame of eczema erythematosum. In one child, two months of age, licate constitution, and imperfectly supplied with food, we saw the lescribed form of the disease occupying at the same time the groins, xillæ, and the folds of the neck. The attack lasted two weeks, and nearly proved fatal from the violent suffering it caused. In another , not quite a year old, who was teething, it presented these charac- in the neck, and axillæ, while in the groins it was much less severe, atter parts being merely excoriated.

fants attacked with severe diarrhœa, with dysentery, or entero-colitis, especially with that form of entero-colitis which so generally accom- s thrush, are very apt to have an erythema of the nates, genital , and the internal surfaces of the thighs. So common, indeed, is occurrence that M. Valleix regards erythema of these parts as an st constant accompaniment and even precursor of thrush. For our part we have very often met with it in cases of diarrhœa in infants, in those of very moderate severity, but we have never seen it precede ppearance of the intestinal disorder.

is form of erythema begins as a simple redness of the skin about the , between the buttocks, about the genital parts, and over the inside e upper parts of the thighs. In a mild case of diarrhœa, and in a properly cleansed after each evacuation by stool or urine, it will go rther than this: but in a severe attack of inflammatory diarrhœa, ded with frequent acid stools, and in a case in which proper cleanli- is not attended to, the long-continued contact of the discharges and d napkins will often cause the erythema to assume very distressing res. The redness extends in such instances along the leg to the

remain at the points where the ulcerations had
and copper-colored spots, which do not disappear for a
of time. This form of erythema rarely ceases entirely
which has occasioned it has itself been cured.

**Erythema Nodosum** generally occurs in feeble and
We have never met with it under five years of age. It may
upon different parts of the body, but occurs in by far the
the cases on the forepart of the legs, or over the anteri
tibia. We have only twice seen it elsewhere, and then it
upon the outer surfaces of the arms and forearms. It is pre
for several days by general indisposition, by lassitude, thirst,
petite, and some feverishness. It appears in the form of
oval shape, somewhat elevated in the centre, and which in
ally in size. After a short time these patches become deci
above the surrounding surface, and in passing the hand over
give the sensation of nodosities. They increase gradually
to measure from a few lines to an inch or an inch and a half
an inch or an inch broad, when they present the appearan
tumors, somewhat painful to the touch, and having an obscu
fluctuation, as though about to suppurate. This, however,
but after a short time they diminish in size, their red color
a bluish or livid tint, they soften, and finally disappear entir
twelve or fifteen days. We have met with five well-marked
disease. Three occurred in girls between six and twelve
and two in boys of the same age. They all appeared to de
rangement of the digestive function, attended with a some
ished state of the blood, and general debility.

**Diagnosis.**—The only disorders with which erythema could
founded are erysipelas, roseola, or scarlatina, and this could
in regard to the erythema fugax. From erysipelas it may be dis
by the superficial character of the eruption, the absence of
of smarting and burning

ys, disappears without having followed the erratic course of
r.

ola the peculiar deep rose-tint of the rash will serve to distin-
ween it and the lighter red tint of erythema.

ld character of the general symptoms, and the absence of throat-
in erythema, will prevent any one who is careful from mistaking
se for scarlatina.

ma intertrigo cannot be mistaken for any other disease, and if
e and peculiar local characters of erythema nodosum be borne
it also may be easily recognized. The only thing with which
r might be confounded is phlegmonous erysipelas, but if the
racter of the general symptoms in erythema nodosum, the dis-
rcumscribed form of the tumors, and the fact that the disease
minates by suppuration, are recollected, there need be no diffi-
making the diagnosis.

osis.—Erythema is a very mild disorder in a large majority of
. The only conditions under which it proves serious are when
trigo attacks children laboring under chronic entero-colitis, or
ected with severe thrush connected with gastro-intestinal inflam-
when it cannot fail to increase the sufferings and danger of the
or, when it implicates, as we have seen it do in two instances,
portions of the cutaneous surface, involving the folds of the
npits, groins, and genital organs, and this, too, without any
ns of disorder of the digestive apparatus than those showing
l derangement. In one of these cases the extent and depth of
ations were so great, and the resulting suffering and constitu-
stress so severe, as to have very nearly destroyed the life of the
ho was but two months old at the time of the attack.

ma nodosum would almost certainly excite some uneasiness in
of a practitioner unacquainted with its real nature and probable
nd not only so, but it would prove tedious and difficult of cure,
eated in the proper way. When managed correctly, however, it
ways gets well without any difficulty.

MENT.—Erythema fugax requires no special treatment. The
which has occasioned it is the point to which our attention must
l, and not the eruption, which is a mere consequence.

ry, mild cases of intertrigo require no other measures than at-
o strict cleanliness. The irritated parts must be carefully washed
ree times a day, and if the nates, genital parts, and thighs are
d, the washing must be repeated after each evacuation of urine
After this the parts should be dusted with fine starch, with the
f chalk or lycopodium, or with calomel, which, in our hands, has
l best of all, or else be well anointed with some mild ointment, the
which is, in our opinion, Goulard's cerate. The washing ought
formed with a fine soft sponge and warm water. The sponge is
r than the cloth generally employed, because, with the former,
sing can be effected by pressure, whilst with the latter it is neces-

severe, and when ulceration is present, we tained any good effects from powdering; on the contrary, proved injurious, and is at least troublesome and annoying crusting of the powder about the ulcer. We prefer, therefore, when ulceration is present, to dress the part with simple cerate, Turner's cerate, or with ointment of oxide of zinc. should be applied on a fine rag greased on one side, the rag and interposed in such a way between the opposite surfaces tion, as to be accurately applied to the whole extent of the thus prevent all friction or even contact of the opposite compresses ought to be changed three or four times a day, discharges gently but carefully washed off by *pressure* with between each change of dressing.

Whilst this topical treatment is being carried out, constant must be paid to the state of the digestive function. It is sary to apply this remark to cases occurring in the course of entero-colitis; but there is another class of cases that we have in which, though the intertrigo is severe and obstinate, lasting as two, three, or four weeks, the signs of gastro-intestinal slight as to pass unnoticed unless carefully inquired into. consist merely in the fact that the child has a few more than usual, or that the stools are more liquid than they should they exhibit marks of derangement of the digestive process pearance in them of imperfectly digested curd of milk, or by color and sour smell. Whatever be the character of the this function, as shown by the general appearance of the child tite, degree of thirst, or the appearances presented by the should always endeavor to rectify the disorder, and if the successful, we shall often see the intertrigo vanish at once, it had resisted all the means employed for its cure.

Erythema nodosum occurs generally, as already stated, in dren, and is usually accompanied with pale and anæmic, iron is the proper remedy. It should be connection with the tincture of bark, or with small doses of when the appetite is poor, and the strength and spirits of the ıch below their natural level.

al remedies are not necessary as a general rule. When, however, l symptoms are severe, or there is much heat or pain in the tumors, ould be kept covered with compresses moistened with some kind ılage, or with lead water and laudanum.

## ARTICLE II.

### ERYSIPELAS.

**INITION; FORMS; FREQUENCY.**—Erysipelas is a specific, acute, , non-contagious exantheme, characterized by a deep red rash, at- with heat and swelling of the skin, sometimes with inflammation subjacent cellular tissue, and terminating generally in resolution, netimes in suppuration or gangrene. The disease is very variable ts extent, and has the peculiarity of spreading from place to place, rt first attacked recovering, whilst the neighboring surface is be- g affected.

disease, as it occurs in children over six months of age, presents me characters as in adults, and requires therefore no particular on in this work. In younger children, on the contrary, and es- y in the new-born infant, it is different in several particulars from ' older children or adults, and this we shall attempt to describe. rm which occurs in new-born infants, has been technically named las neonatorum.

ipelas is a rare disease in private practice, particularly amongst s in easy circumstances. In lying-in and foundling hospitals, on itrary, it is of frequent occurrence, and it is not uncommon in hos- for children and in the children of the poor. We have ourselves th but four cases of erysipelas in children under six months of age, we have met seven in older children.

**SES.**—The erysipelas of young children almost always starts from reviously existing cutaneous inflammation, the most frequent seats h are the umbilicus during the process of separation of the cord, itated folds of the skin existing in erythema intertrigo, the inflam- ı accompanying the vaccine disease, and that which exists in the ıtous and impetiginous eruptions of the scalp, ears, and face. In majority of the cases observed in new-born children, the disease upon the abdomen, and generally at the umbilicus. In those which in children at the breast, it may show itself at any of the points mentioned.

disease occasionally follows vaccination. We have ourselves met

But, though erysipelas commonly starts from, and ma
seem to be produced by these different local irritations,
to suppose that they can be anything more than the exci
causes, which bring into action a disease of which the se
in the economy. We must, therefore, in order to und
mode of causation of erysipelas, seek for the conditions
this predisposition to the malady, without which the a
exciting causes would rest without effect. These conditi
general epidemic constitution of the air, affecting certain di
try, and acting more or less upon all classes of the comm
especial force upon the destitute and miserable; or else a l
constitution, such as that often occasioned by the unfav
conditions of hospitals, and particularly of lying-in and f
pitals, or that not unfrequently determined by the same
crowded and miserable habitations of the poorer classes o
tants of large towns and cities.

SYMPTOMS.—Infantile erysipelas is not generally preced
stitutional symptoms. The appearance of the eruption is
sign of the disease. As soon, however, as the eruption ap
soon after, the child is attacked with fever, marked by
heat and dryness of the skin, restlessness and insomnia, and
the form of the disease which occurs in very young infants
pitals, or amongst the lower classes of the population, the er
always begins upon the abdomen, and very generally at th
whence it extends to the rest of the trunk, to the genital parts
times to the inferior extremities. Even under the circum
mentioned, however, the eruption sometimes commences up
or upon the limbs. In children over two weeks of age, and
served in private practice, the disease may begin upon any
surface. It very often

hue, and as this occurs, becomes exceedingly hard to the touch, what, though not very much swelled. As the case goes on, unlution, which is a rare event, should take place, or death occur ly period, the purple color deepens into livid, vesications occur, ar tissue is destroyed, and in many instances extensive gangrene ace, so that the scrotum has been seen to "become black and way, leaving the testicles bare, and hanging loose by the cords." *'ll and Evanson.*) In a case that occurred to one of ourselves in practice, the disease began on the ninth day at the umbilicus, and l the soft tissues of the anterior wall of the thorax and abdomen. n sloughed in several places, exposing the muscles; and at one ust below the epigastrium, perforation of the abdominal wall oc- Death occurred on the fifteenth day of the disease. In this form ntile erysipelas, examination after death almost always discloses and extensive peritoneal inflammation, a condition which cannot course, to add greatly to the danger of the disease.

infantile erysipelas does not always exhibit these violent characters, ı whenever it occurs in infants under a year old it must be regarded ery dangerous affection. When it attacks children over two weeks ıonth old, it usually starts, as has been stated, from the neighborof a vaccine pock, from the inflamed surfaces of intertrigo or those ematous or impetiginous eruptions, or it begins without evident , as in adults, on the face, or on some part of the extremities. It rs first in the shape of a bright red inflammation of the skin. After rt time the erysipelatous surface becomes tense, shining, very hot, ly swelled, and painful to the touch. Pressure causes the color to pear, but this rapidly returns when the pressure is removed. Cointly with the appearance of the cutaneous redness the child is seized fever, restlessness and severe thirst. From the spot first attacked isease extends rapidly to the neighboring surfaces, from the neck rms to the head and trunk, and from the groins or genital parts to est of the trunk and to the inferior extremities. When it begins the face, it extends to the scalp, and may thence travel over the surface, or it may remain limited, as it often does in adults, to ead alone. In one case that we saw, in an infant three weeks old, ich it began upon the face, it extended gradually over the whole eous surface, and yet the child recovered. In another, two months t began upon the bridge of the nose, and from thence extended over hole head, but did not reach the trunk or limbs. In a third case a nated arm was attacked with erysipelas on the eighth day of the vacion. The disease extended down to the fingers, and upwards to the der. From the shoulder it spread gradually over the whole trunk, lown the whole length of both lower extremities. As it was subsiding ıe feet, it appeared on the arm opposite the one first attacked, and attacked the corresponding side of the head, where it ceased. The finally recovered after an illness of three weeks.

the peculiar inflammation spreads to the neighboring surfaces, the first attacked lose their red color and swelling, and undergo a pro-

the skin between the abscesses had regained its natural
the exception of the desquamative process, which was
In another, but rarer set of cases, the inflammation
the parts over which it has already passed.

The swelling which accompanies this disease, is usually
tous nature,—the œdema being most marked in the
upon the face, whilst upon the trunk it is much less

The general symptoms consist at first, as already stated,
cating a strong febrile reaction. If the case goes on
symptoms continue until the disorder terminates. But
is severe, and especially when it ends in vesication, in
tion of the cellular tissue, or in gangrene, the general
more violent, marking thereby the gravity of the attack.
lips become pale, and the tongue and mouth dry. The
of constant agitation at first, and expresses its uneasiness
by incessant moaning or crying, but after a time it
drowsy from exhaustion. The pulse is very frequent and
and vomiting make their appearance, and the child dies at
of profound debility; or convulsions occur towards the
nate the case as they so often do in the diseases of infancy

The *duration* of erysipelas in children is extremely
pends very much upon its form. In that which occurs in
child, or within one or two weeks after birth, it sometimes
within seven days according to Canstatt (*Handbuch der*
ed., vol. ii, p. 264). M. Bouchut (*Mal. des Enf. Nouv.-Nés*,
as an approximation to the ordinary duration of infantile
tween four and five weeks, and states that this is also the
at by M. Trousseau. In one of the cases alluded to by
the disease extended over the whole cutaneous surface,
was four, while in another it was three weeks; in the one
eruption was limited to the head, the duration was a week.
remaining cases, the

ise degree of danger in individual cases will depend chiefly on
mstances: first, the age of the subject; and second, the hygienic
s under which the disease occurs. It is exceedingly dangerous
orn infants, so much so indeed that M. Bouchut declares that
die (*loc. cit.*, p. 532). This is in all probability almost strictly
he cases which occur in infants only a few days old, particularly
ey take place in lying-in hospitals, or even in private practice,
he prevalence of an epidemic of puerperal fever. The disease is
very dangerous in hospitals, even in infants over two weeks old.
ould appear not to be so grave as represented by M. Bouchut,
ks that very few indeed have been cured even at that age; for,
y cases in infants between one day and a year old observed by
at the Foundling's Hospital of Paris, sixteen, or only one more
f, proved fatal. Schwebel reports 54 deaths in 86 cases (*Meissner*,
*rankheiten*, 3d ed., vol. i, p. 372).

ivate practice, erysipelas as it occurs in children between two
nd a few years old, is a dangerous malady, but yet is far from
in the same degree as in the new-born infant, and in hospitals.
e already stated that we have seen four cases in young infants;
days old, in whom the disease proved fatal in fifteen days; one
eks old, in whom the disease lasted four weeks, and travelled over
le cutaneous surface; another ten weeks old, and in whom also it
over the greater part of the cutaneous surface; and a fourth two
old, in whom it remained limited to the head. These three last
d. Again, we have seen seven cases of erysipelas of the face or
children between seven months and twelve years old, and these
led favorably. It must be recollected, however, to account for
coveries, that they all occurred in hearty children, and under the
vorable hygienic conditions met with in private practice. To con-
M. Rilliet and Barthez report nine cases of erysipelas of the face
ren, all of whom, with three exceptions, were over five years of
ive of the nine cases were idiopathic; in four the disease compli-
her affections. All of the spontaneous and one of the complicated
covered. The two others, both of which occurred in subjects la-
nder measles attended with pneumonia, proved fatal.

TMENT.—The treatment of erysipelas in new-born infants, espe-
hen the subjects of the disease are the inmates of a hospital, and
occurs coincidently with a puerperal fever epidemic, is, as may be
from the almost certain fatality of the disorder, exceedingly
M. Trousseau (*Barrier*, *Traité Prat. des Mal. de l'Enfance*,
60) has made trial unsuccessfully of emollients in every form, of
tions, lotions, baths, and of ointments containing sulphate of iron.
tried," he says, "surrounding the whole body and limbs, with
in the form of strips; the erysipelas has passed over the obstacle.
pplied without success blisters upon the surfaces already invaded
nflammation. I have obtained no advantage from mercurial oint-
from baths containing corrosive sublimate." He even tried the

matter has been formed,
has sunk under the discharge." He adds that he then
which, sometimes, a little confectio aromatica was added
that period several cases recovered. After this, linen compres-
out of camphorated spirit, were applied in the place of the
tion, and proved successful in several instances in checking
mation. "Nevertheless, the greater number of infants atta
disorder sink under its violence, and many of them in a
(*Treat. on the Dis. of Children*, Am. ed., by Dr. Bell, from
ed., p. 103.) In a note to the above, Dr. M. Hall states that
of extract of poppies diffused in warm water, and poultices
the same fluid and crumbs of bread, proved beneficial in many
Dewees recommends the application of a blister, when the
so situated as to allow the whole surface of inflammation
of the neighboring healthy surface to be covered by the plaster
this cannot be done, he prefers the use of the strong mercurial
which must be applied over the whole of the eruption, and
the healthy skin, and renewed as often as the part becomes

It is very difficult amidst the variety of advice given by differ
and especially when we reflect upon the great mortality of
under every kind of treatment, to determine which to select.
own part, we should prefer the use of cooling emollient
during the first part of the attack, whilst the skin is of a bright
hot, and shining. When the circulation becomes languid, and
of the eruption is disposed to deepen from red to purple, we
pend the use of the emollient applications, and employ instead
of camphorated spirit recommended by Underwood; the
tincture of soap, which we have known to be of great service
sipelatous inflammations occurring in patients of broken-down
tion, and which is to be applied three or four times a day by
soft sponge; or lastly, we would make trial of Kentish's
remedy found of great service by the late Dr. Charles D. Me
erysipelas of children

tities of brandy, and bark in connection with minute doses of of ammonia.

tion to these, the tincture of the chloride of iron, whose re- and almost specific influence upon the course of erysipelas in nced life is so well established, should be given in large doses, ed to the tender age of the patient. Thus we may give two ops every three hours to an infant of a month old, as in the formula:

| | |
|---|---|
| .—Tr. Ferri Chloridi, | fʒss. |
| Acid. Acetic Dil., | fʒss. |
| Liq. Ammoniæ Acetat., | fʒj. |
| Syr. Simp., | f℥ss. |
| Aquæ, | ad f℥iij.—M. |

S.—A teaspoonful every three hours.

e inflammation has gone on to the production of subcutaneous n, it becomes still more important to sustain the forces of the n, by giving the infant a healthy and abundant breast of milk, internal use of brandy in small quantities, of bark, or better inia in combination with small doses of carbonate of ammonia. e time the suppurating surfaces must be well fomented, and th warm poultices, and when necessary, laid open by careful bserving the precaution to cause as small a loss of blood as If the case occur in a hospital, or in a child placed in unfavor- nic conditions, let the following statement of M. Barrier be ind. "However much the life of an infant be threatened by if we can but persuade a wet-nurse to take charge of it, the the country is often seen to replace most advantageously all peutical resources" (*loc. cit.*, t. iii, p. 562).

receding remarks have been restricted to the form of the dis- occurs in infants under two weeks of age, we have now to observations on the cases which occur in older children.

ase is still, even at this latter age, a very dangerous one, though so, certainly, than in the new-born child. We have been de- the use of depletion in any form by two reasons—the fear of , which is so apt to occur in the disease, and the apprehension ech-bites or cup-marks, in the case of local depletion, might foci of the erysipelatous inflammation. The only internal ecessary in the beginning, are such laxatives as may be re- keep the bowels soluble when they are bound, such as shall dity or diarrhœa when either is present, and those which pro- en state of the skin, and a free discharge of the urinary secre- the latter purpose we know none better than the solution of of ammonia, and the sweet spirit of nitre, about twenty or s of the former, with five of the latter, in sweetened water, to d every two or three hours. The tincture of the chloride of d also be given, in the combination before recommended, in , as three to six drops, every three hours, at the age of one or

of carbonate of ammonia, in weak syrup of ginger,
four or five times a day, or more frequently, when the
are greatly prostrated. The proper tonic is from a
of extract of bark, or half a grain of quinia, in some
every three or four hours.

The best local treatment is, in our opinion, cooling
applications, as slippery elm bark, marsh-mallow, or
the first few days, whilst the reaction is marked, and the
the body high. Somewhat later, when the strength begins
and the color of the eruption to deepen, we should make
mercurial ointment, which is highly recommended by
Kentish's ointment, or camphorated tincture of soap,
tion has already been called. We would here propose the
ment which we have found not only soothing and comforting
but also of manifest curative efficacy in the violent cutane-
tion of scarlatina. It consists of one ounce of fresh cold
up with a drachm of glycerine. It should be smeared over
surface several times a day, and need not interfere with the
lient applications. In scarlatina it has been most useful in
burning heat of the eruption, and in softening the harsh
skin, and by these effects has aided greatly in moderating
the general, and especially of the nervous symptoms.

In children over two or three years of age, erysipelas
on the same principles as in adults, by light but nourishing
in bed, by the internal use of laxatives occasionally, of
tincture of chloride of iron, and of febrifuges, and by the
cation of emollient infusions, so long as the symptoms
the strength unreduced. But when, after a time, the fever
side, or the child begins to show signs of debility and a

## ARTICLE III.

### ROSEOLA.

TION; SYNONYMES; FREQUENCY; FORMS.—Roseola is a non-con- ugacious exantheme, characterized by rose-colored patches, of size and shape, which are unaccompanied by elevations or and the appearance of which is preceded and accompanied by mptoms.

ften called in this country scarlet rash, and under that title sup- constitute a very mild form of scarlatina. It is sometimes called nch measles, and rubeola sine catarrho.

la is of rather *frequent* occurrence amongst children, though re than either measles or scarlet fever.

are three *forms* of the disease met with in children, roseola roseola autumnalis, and roseola annulata. As the two former, r, present no differences of any importance, we shall describe der one head, whilst the latter, quite unlike the other two, re- hat we should describe it apart.

ES.—Roseola may occur at all *ages* of infancy and childhood, and *season*, but is most common in summer and autumn. It has been to prevail as an *epidemic*, but has never been thought *contagious*. attack the same individual on several different occasions, one not preserving from repetitions. The variolous eruptions are nes preceded by roseola, and in some children it makes its ap- ce on the ninth or tenth day of the vaccine disease. Of the various that we have known to produce it, the most frequent is certainly ement of the digestive function during the first dentition. It is so to be occasioned by sudden changes of temperature, by violent e, and by the use of cold drinks while the body is heated and moist erspiration; causes which strongly indicate that the nervous sys- closely connected with its production.

PTOMS.—Young children who have been suffering for a few days isorder of the digestive function, often exhibit a slight roseolous n, lasting twenty-four or thirty-six hours, and then disappearing. uption in this mild form of the disease appears suddenly, often in rse of a single night, covering the trunk or even the whole surface umerous patches, nearly circular in shape, or in irregular, broad, ving lines, situated close together and yet distinct, and of a light lor. In another, and rather more violent form, occurring espe- luring dentition, the eruption appears after vomiting, fever, diar- and slight nervous symptoms, or possibly after slight convulsions, he characters above mentioned, except that the rash is deeper in greater in extent, and that it lasts generally a longer time—two, or four days. Again, in a yet more marked form, the roseola and autumnalis, the disease is preceded by certain symptoms

continued for two, three, four, or
days, the eruption appears first upon the face and
tends in twenty-four or forty-eight hours to the rest of
rash resembles very closely, in some cases exactly,
is in the form of irregularly circular and rather large
a red, but soon changing to a deep rose color, and
other by portions of healthy skin. The eruption is
panied by itching, and sometimes by stinging pain, and
toms generally continue, though moderated in degree,
ance of the rash; while in other instances the fever
from that moment. The rash lasts between one, and
as a general rule, and fades away gradually until it has
peared. In some cases it comes and goes alternately for a
first appearance.

ROSEOLA ANNULATA is a curious and interesting form
from the singular and beautiful appearance of the
rings which constitute the eruption. We have seen but
of this variety, while we have met with a large number
other forms. It must, however, be of very rare
Guersant and Blache state that they have never chanced
though they have seen a large number of roseolous
*Méd.*, t. xxvii, p. 626).

This variety of roseola appears in the form of rosy
whose centres retain the natural color of the skin. The
the eruption are the abdomen, loins, buttocks, or thighs,
the greater part of the body. In one case that we saw,
covered the face, neck, and trunk. In the other it was
face, trunk, and upper extremities. The rings are at first
one or two lines in diameter, but they enlarge gradually until
measure as much as half an inch in diameter. In some
three rings surround one another, the skin in the intervals
still retaining, however, its natural

scarlet rash, as examples of a very mild form of scarlatina, a ension which will explain some at least of the supposed in- second attacks of scarlet fever in the same individual. This ke, however, that ought not to occur, and need not, if the fol- aracters of the two diseases are properly understood. The rash ina is, in the first place, of a much brighter tint, and it is more and more uniformly spread over the surface than in roseola. come to analyze the characters of the two eruptions, there are tinctions between them which assist greatly in making the diag- n scarlatina, the eruption is composed of very large patches, or olutely uniform, and evenly distributed over large surfaces, as whole trunk, or over the flexor or extensor aspects of the limbs. n to be composed, too, when minutely examined, of an aggrega- very minute red points, which are dotted so closely together, as nt the appearance of a general scarlet blush. In roseola, on the , the rash is composed of irregularly circular, crescentic, or waving , with portions of skin between of a natural or nearly natural color. ches, moreover, are of different tint from that of scarlatina, being ep rose, instead of a bright red or scarlet color, and they cannot, ose examination, be resolved into the minute dotted points which p the scarlatinous eruption. When we add to these circumstances s, that in roseola there is no faucial inflammation, that the pulse the same frequency almost invariably present even in very slight scarlet fever, that all the general symptoms are much less strongly , that no desquamation takes place in roseola, and that the dura- the attack is much shorter, we think we have points of difference the two, quite numerous and marked enough, to render the dif- l diagnosis easy to a careful observer.

s always seemed to us impossible to distinguish with certainty be- oseola and measles by the eruption alone, and we find that MM. and Barthez are also of this opinion (*Mal. des Enfants*, t. i, p. We are told by writers that in roseola the patches composing the n are more distinct, larger, paler, and more irregular in shape than les, and that they are separated by intervals of healthy skin; but quite satisfied that in some cases witnessed by ourselves, these ces were not sufficient to distinguish them. The diagnosis is to be y attention to the following points: by the absence of catarrhal ms in roseola, by the slighter severity of all the general symptoms, the much shorter duration and greater irregularity of the initial ena, which latter seldom last in roseola more than one or two days, nsist of symptoms of gastro-intestinal derangement, whilst in s they last three and almost always four full days, and consist of rongly marked catarrhal or respiratory symptoms, with very slight f gastro-intestinal derangement.

ola annulata is so peculiar and characteristic in all its appearances prevent its being mistaken for any other disease that we are ac- d with.

NOSIS.—Roseola is probably never dangerous to life. If it ever

## ARTICLE IV.

### URTICARIA.

**DEFINITION; SYNONYMES; FREQUENCY; FORMS.**—U
contagious exantheme, characterized by hard elevations
uncertain size and shape, and of a reddish or whitish
quently, partly red and partly white; the eruption is
duration, is almost always accompanied with intense
itching and burning, and is preceded by more or less
gastro-intestinal disorder.

Its most common title is that of *nettle-rash*. The mild
of the disease is generally called *hives*, in the nursery.
described under the name of *essera*. It is of very
amongst children in a mild shape. We have seldom seen in
abundant and severe eruption covering the greater part
which is met with in adults.

The most common *form* of urticaria in adults is well
*urticaria febrilis*, which is an acute disease of short duration.
forms of the disease, the *urticaria evanida* and *tuberosa*, are
met with in adults, though they are both rare. In children
most frequent form of the disease that we have seen is one
is scarcely any fever whatever, and in which the eruption
the urticaria febrilis is, however, not at all uncommon in
on the other hand, we have never met with an instance either
evanida or tuberosa at the age referred to.

**CAUSES.**—Children possessing a fine and delicate skin,
they are at the same time endowed with a highly nervous
are particularly

children are exceedingly liable to the appearance upon different the body of a few patches of urticaria. Very slight disturbances astric functions, a very warm day, and excessive clothing, will in such subjects an attack of the disorder; whilst in many others e disease is never seen under any circumstances, or only at rare intervals.

ROMS.—The form of the disorder most commonly met with in chil- which there is neither fever nor other marked signs of disorder eneral health, is the disease generally described under the title of *rticatus*, but which ought, it seems to us, to be considered as one varieties of urticaria. This eruption consists of large inflamed s, which are irregular in shape, being either rounded or oblong, ing most in the centre, and which appear suddenly, without any or ight prodromic symptoms. The papules are of a bright red color, ing in their projecting central portions, where they are whitish or ry pale red tint. The eruption is accompanied with a smarting urning pain, and with the most violent and annoying itching, which ild endeavors to allay by frequent and often rude scratching. It is ugacious in its character, appearing suddenly, lasting for a few hours eral days, and then disappearing entirely, or recurring again after t time in the same or in new places. It terminates finally, after a few days to several weeks, by resolution or by a slight furfuraceous amation. The most common seats of the eruption in children are ce, about the buttocks, or upon the thighs, or upper part of the arms. is is the form of the disease we have met with in infants, and in en under two and three years of age. It is, as already stated, of slight consequence, being merely annoying and never dangerous. In g infants it occasions sometimes much crying and irritability, which e explained only by the discovery of the eruption.

e *urticaria febrilis* is usually, but not always, preceded for a few or two or three days, by feverishness, and by more or less marked of gastric disorder, such as nausea, chilliness, headache, and lan- In other instances the fever and the rash occur at the same time. ruption begins with a sense of itching, and with heat and burning skin, and soon after there appear on the shoulders, loins, inside of rms, and about the thighs and knees, reddish and solid elevations, ular in outline, but generally roundish or oblong. The latter shape one the elevations most frequently assume, and it is from the re- lance which they bear in this form to the marks left by the stripes a rod or whip-lash, that they are often called weals. The elevations ct a good deal above the surrounding surface, forming knots or s; their size is variable; they have hardened edges; they are reddish lor, except over the central and most projecting part, which is gen- , and always when the swelling is considerable, whitish in its tint; hey are surrounded by a narrow areola of a bright red or scarlet The amount of the eruption is very uncertain, the elevations sometimes separated by considerable intervals of healthy skin, in severe cases, they are extremely numerous, and from their con-

The patches of eruption which appear first on the

the disease, but, after lasting from a few minutes to a

away, and are replaced by new and successive crops.

the patient is usually more or less feverish, and he

loss of appetite, furred tongue, and the usual signs of

The symptoms subside gradually, so that after a period

or three days to a week, the disorder has entirely

behind no traces, except in a few instances a slight

When this form of urticaria follows the ingestion of

food, the eruption usually appears within a very few

being preceded and accompanied by nausea or vomiting

tress in the epigastric region, giddiness, headache, and

DIAGNOSIS.—There can be no difficulty in recognizing

caria. The peculiar characters of the eruption, and

shape, and color of the solid elevations of which the

violent itching and burning which accompany it, and its

acter, render it unlike any other cutaneous disease, and

any mistake as to its nature.

PROGNOSIS.—Urticaria is probably never dangerous in

be accompanied by symptoms of a threatening or alarm

these are dependent rather upon the gastric disorder,

of the urticaria, than upon the latter affection itself.

known it to be more than troublesome and annoying.

TREATMENT.—There are but two really important

treatment of this disease: to attend to the state of the

and to allay, by proper means, the distressing irritation

the itching and burning of the eruption.

In the mild form of urticaria, called in the nursery

scientific language, lichen urticatus, the only treatment

ful regulation of the diet, and the use of means proper

evident derangement of the digestive function. The food

and digestible, but at the same time nourishing. Milk, ned rye or wheat flour, which are often very successful. Wash- uption with salt and water, when the cuticle is not broken, is very soothing, and when the patches are of small extent this one without any impropriety. Dr. Watson speaks well of a first recommended by Wilkinson"), composed of a drachm of of ammonia, a drachm of acetate of lead, and eight ounces of r.

urticaria febrilis the treatment must depend upon the cause of k. When it follows upon the eating of some unwholesome food, rid the stomach of the offending substance by an emetic, unless as already caused its rejection by spontaneous vomiting. When has been gained it will be proper to give some kind of cathartic , and the best is castor-oil, as the mildest and most certain, in insure the discharge of the whole of the aliment which has been the mischief; or small doses of blue pill; or hydrargyrum cum ith rhubarb, where there is present any signs of hepatic derange- After this the only treatment necessary will be the use of cooling mulcent drinks, containing perhaps a little sweet spirit of nitre, bed, or at least seclusion in the house, for a few days, and careful ion of the diet. The latter ought to be very light during the con- e of the eruption, consisting merely of milk and bread, or of some gruel or plain broth; after the cessation of the disease, it should mented only with due care and quite gradually. To allay the itch- burning of the eruption, and the general distress of the child, st remedy is a warm bath carefully administered. This may be ed in six or eight hours if necessary, and between whiles the sur- ould be dusted with rye or wheat flour, as above recommended.

# CHAPTER II.

## VESICLES.

## ARTICLE I.

### ECZEMATOUS AFFECTIONS.

already stated in our introductory remarks on skin diseases, the f eczema is no longer restricted to a disease characterized by the ion of vesicles, but embraces all the numerous affections which t redness of the skin, frequently punctated; itching, infiltration, xudation on the surface, with the formation of crusts. So far, in- from vesicles being characteristic of it, it may be said, and espe- in regard to eczema in children, that its rarest form is that which nded solely with their formation. The elementary lesions which e present at the beginning of the attack, are either erythema, s, vesicles, or pustules, and the disease is divided accordingly into

It not unfrequently happens, also, that the various [illegible] enumerated above may be present at the same time on a [illegible] tous eruption, so that a case which has begun as eczema [illegible] or vesiculosum, may present the development of [illegible] thick scabs, and thus become converted into the [illegible] form. This tendency for the blending of several [illegible] same eruption, and especially for the conversion of the [illegible] pustular form, is very markedly seen in cases of eczema [illegible]

Eczema is also divided according to its course, [illegible] into acute and chronic.

Eczema shows, moreover, an especial tendency to attack [illegible] the surface, and presents various peculiarities in the [illegible] in children, it frequently occurs on the scalp and face, [illegible] over the entire surface of the body far more frequently in [illegible] adults.

The special forms of eczema which will be here [illegible] acute eczema; eczema of the scalp, and of the face; eczema [illegible] or impetigo; eczema papulosum; and chronic eczema, or [illegible] mosum.

Causes.—The causes of these affections are, to say the [illegible] scure in most cases. It is probable that some peculiarities [illegible] tion predispose to it, and particularly the lymphatic [illegible] scrofulous or tubercular diathesis. Exposure to unhealthy [illegible] ditions, as want of cleanliness, insufficient or improper food [illegible] or ill-ventilated habitations, also render the system more [illegible] development of eczema.

In those who are thus predisposed, any trifling irritation [illegible] sufficient to provoke the eruption. One of the most [illegible] doubted of these is the influence of the process of [illegible]

constantly meet with the most varied forms of eruption in the
e; and have the opportunity of watching the development of
vesicles or pustules, until a case which has begun as one of ery-
is eczema, presents the characters of the papular, vesicular, and
y of the pustular form. The predominance of one or the other of
ical forms of eczema is determined by the temperament and gen-
dition of the child, and the grade of inflammatory action present.
a *simplex*, or *vesiculosum*, may occur on any part of the body,
children is most frequent on the face and arms. The eruption
, without any precursory symptoms, as an erythematous patch,
red and itchy, and may present slightly raised pimples, and being
and scratched, soon presents the formation of numerous, closely
ated, exceedingly minute vesicles, containing a transparent limpid
After a short time the contained fluid becomes turbid and then
and is either absorbed, while the vesicles shrivel up and disap-
a slight desquamation, or else the fluid escapes by the rupture of
icles, and little thin scales follow, which are detached before long
he surface beneath. The eruption is attended with more or less
and smarting, but does not generally give rise to constitutional
oms. The vesicles are generally renewed by successive crops; so
ough the case may terminate in from two to three weeks, it is apt
tinue for two or more months.

*ema Papulosum.*—In the same way as the above form of eczema is
terized by the formation of vesicles, there are other cases where
ption principally consists of papules, associated with erythematous
s. These papules do not remain dry and without exudation, as in
pical forms of lichen and strophulus, but soon present a slight
r turbid serous oozing, and thin scaly desquamation of the epithe-
At the same time there will usually be found, on other parts of the
patches of more fully developed eczema. The papules in eczema
le may either be firm, small, and conical, as in lichen agrius, or
and more broad and flat, as in some forms of strophulus.

*ema Pustulosum or Impetiginoides.*—Under this head we will de-
the affection usually styled impetigo, and formerly classed among
stular diseases of the skin, but which possesses peculiarities which
induced dermatologists to transfer it to the group of eczematous
ons.

nay be described as a form of eczema characterized by the produc-
f psydracious sero-pustules, containing a thin purulent fluid, which
break and discharge, or dry up and form thin amber-colored or
thick yellowish-brown crusts.

e eruption usually begins as a reddened patch, studded with slightly
l pimples. As the inflammation increases, the cuticle is often raised
nore or less well-defined vesicles, or the surface becomes excoriated,
here is a discharge of turbid or whitish-yellow secretion; the skin
becomes infiltrated, and numerous rather small pustules, containing
ht-colored pus, form on the red swollen surface. Not unfrequently
are vesicles on the same patch, surrounding its margin. These

form; the eruption retreats to certain seats, as [illegible] of the joints, where the skin remains somewhat [illegible] cuticle is rough, scaly, and constantly desquamates, [illegible] a fine furfuraceous exfoliation, or of scales of [illegible]

There are in reality but two specific varieties of this [illegible] impetigo figurata, and impetigo sparsa, so named from [illegible] which the pustules forming the eruption are arranged. [illegible] frequency and severity of the disease, however, as it [illegible] scalp in young children, it has become customary to [illegible] seated upon that part, under a different title.

*Eczema capitis* is often met with in infants at the [illegible] first dentition, and at later periods of childhood, in the [illegible] lous, or who are placed in unfavorable hygienic conditions. [illegible] confined to a small portion of the scalp, or it may cover [illegible] extend to the face and neck; or again, it may be limited [illegible] latter localities, when it constitutes eczema of the face. [illegible] the eruption is very apt to run into the pustular form, [illegible] disease known as impetigo capitis.

When mild in its features, it consists of an eruption of [illegible] vesicles or sero-pustules, spread over certain portions of [illegible] which it may remain limited; or it may cover the face at the [illegible] or it may attack alone the forehead, temples, and perhaps [illegible] cheeks. It is attended, under these circumstances, with [illegible] ness and heat of the integument. The sero-pustules discharge [illegible] contents and form thin crusts, which gradually fall off, leaving [illegible] reddened or excoriated surfaces, which soon disappear, or [illegible] by fresh crops of eruption, destined to pass through the same [illegible] the preceding ones.

In more severe cases the disease may be confined either to [illegible] face, or it may, as stated above, exist upon both simultaneously [illegible]

red, tense, swollen and painful. The eruption is now more
ly pustular, and as the pustules open or are torn by the uncon-
scratching, they discharge an abundant thin sero-pus, or even a
d viscid fluid, which glues the hairs together, and hardens into
brownish-yellow crusts. If the scalp is not kept clean by constant
or by emollient applications, the crusts increase rapidly in thick-
successive discharges of fluid from the pustular surface beneath,
length the whole of the diseased part is covered with thick, heavy,
and adherent crusts, of a brownish or yellowish-white color, or at
a positive black from the admixture of blood which oozes from
amed surface, torn by the nails of the little sufferer.

n neglected, the crusts become more and more thick, and from the
the head and exposure to the air, they undergo partial decompo-
and exhale a fetid, sickening odor, of the most disgusting kind.
the children of the poor and destitute, lice often form in abun-
and add to the repulsive character of the disease. At first, the
are somewhat soft and moist, from the percolation through them
fluid exuded beneath; but as they become more abundant and
r, their outer surface becomes dry and sometimes very friable. The
on from the inflamed surfaces often makes its way under the crusted
above, and, flowing down over the forehead and behind the ears,
es the parts that were before healthy, and thus extends the disease.
en the crusts are removed by any means, the surface of eruption is
to be red, shining, wet, and discharging an abundant purulent or
urulent fluid, which escapes from minute excoriated points, dotted
y over the inflamed scalp. The scalp is at the same time tumefied,
r to the touch, and abscesses may form beneath it. The lymphatic
s, as the occipital, submental, or cervical, are frequently enlarged,
t times suppurate.

en the disease has lasted a considerable length of time, it tends to
e a chronic form. The inflammatory action extends to the hair
es, and often occasions partial loss of hair over larger or smaller
es. This kind of alopecia is not, however, permanent. The hair
are not destroyed, but merely inflamed, so that the hair grows
after the cure of the disease. The tissues of the scalp remain
ned, but the amount of the secretion diminishes; and the painful
ion and itching are less troublesome. Under these circumstances,
usts are less thick and massive; they become lighter, thinner, and
ore easily detached. The epidermis is dry, uneven, and rough, and
is a continual desquamation of fine furfuraceous particles, consti-
a form of pityriasis capitis, or of epithelial scales of various sizes,
bling a case of psoriasis.

the *face* (*Eczema faciei*), the disease usually shows itself first on
rehead and cheeks, to which parts it may remain limited, or whence
y extend to the lips, chin, ears, and neck. The nose and eyelids
ldom attacked, though we have occasionally seen the upper eyelids
ly affected.

eruption is more truly pustular, the pustules being
large, and the discharge copious, so that when the
not interfered with by topical applications, or by the
child, large portions of the affected surface become
yellowish, brownish, or brownish-red crusts, which
appearance of a mass of incrustation, broken by cracks
portions of very irregular size and shape.

In the milder cases, when the scales drop off, the skin
dened and moist, or may seem to be covered with a very
epidermis which is perfectly dry or presents tiny drops of
cracks. In the more severe cases, if the crusts are detached
the skin beneath appears red, swollen, inflamed, and
or less abundant sero-purulent fluid, sometimes mixed
oozes from numerous small points on the excoriated
face. The eruption is attended with severe itching and
lieve which the child often tears the affected surface with the
frequently to remove the crusts, wound the skin beneath,
or less bleeding from the part.

In this more severe form, when the discharge forms a thick
scab covering the scalp or face like a mask, the disease
names of porrigo or impetigo larvalis, which are less accurate
larvale. It corresponds to the impetigo figurata, as met
parts of the body.

When the eruption is more scanty and developed in
the scalp alone, the discharge is less copious, and soon
dry, friable, brownish crusts of irregular shape, some of
adherent, matting together a larger or smaller number of
others are broken into small and dry fragments, which
pared to particles of mortar dispersed among the hair. Many
tules in this variety are formed at the base of the hairs.

disease has lasted a considerable time, it often induces extreme
nd impairs severely the general nutrition of the child. In other
wever, the general health remains perfect,—all the functions of
going on well, notwithstanding the local distress and irritation.
phatic glands situated behind and in front of the ear, and those
ack and front of the neck often inflame, enlarge, are frequently
l painful to the touch, and in a few instances suppurate, though
r occurrence is not frequent.

luration of eczema larvale is very variable in different cases.
ses, and particularly those in which the eruption is confined to a
extent, often get well, or are readily cured in two or three months.
on the contrary, the disease is severe and extensive, the duration
n longer, seldom less, according to our experience, than several
or even one or two years. In most cases, however, the intensity
lisease varies from time to time, so that at one period it may seem
subsiding rapidly, or it may even disappear almost, or be very
ameliorated, only to break out again with renewed violence under
uence of some exciting cause, as the cutting of new teeth, some
in the weather or season, or some alteration in the health of the
which cannot be explained. This affection is, as already stated,
entirely confined to the age of dentition. The disease often begins
nonths before the appearance of the first teeth, and though it gen-
ceases, or is cured before the termination of dentition, we have
it to run on unchecked three months after the conclusion of that
s and then to be removed only by medical treatment.

ema granulatum is comparatively a slight disorder, and is usually
more under the control of remedies and of much shorter duration.

re is a local variety of eczema which requires a brief allusion. It
wn as eczema tarsi and affects the edges of the eyelids, especially
umous children in whom it is often associated with strumous oph-
ia. It is attended with the formation of pustules at the openings
hair follicles, itching, thickening of the eyelids from infiltration, the
tion of crusts, and a tendency to adhesion of the edges of the lids
ier, especially in the morning after they have been in contact during
If not cured by appropriate treatment it frequently leads to dis-
n of the hairs, which assume abnormal directions in their growth,
inversion or eversion of the lids.

ema impetiginoides also presents itself in other parts of the body
the same two forms of impetigo figurata and sparsa which have
lescribed as occurring on the head. We have, indeed, more than
lluded to the tendency of eczema in children to develop itself in
nt parts of the surface, at times occupying almost the entire cutane-
rface, and presenting all its varieties at one and the same time.

etigo figurata, when seated on the trunk or limbs, usually pre-
a large eruptive surface. On the arms we have seen it extend
the shoulders to the hands, and, as a general rule, it has been
evere on the outer portions of the limbs. On the trunk and lower
iities it has usually affected surfaces of much less considerable size,

or grouped closely together. appear singly or in small [illegible] frequently appears on the face and scalp. but is also met [illegible] tr·mities. being not unfrequent in children. according [illegible] hands and feet.

The eruption appears as small yellow pustules, seated [illegible] base and attended with more or less itching. The [illegible] sents a surrounding circle of confluent vesicles or [illegible] tules soon break and discharge a sero-purulent fluid, which [illegible] a rugous, more or less projecting, friable crust, seeming [illegible] ferent layers superimposed one upon the other. When the [illegible] after their removal by topical means, there remains [illegible] surface, which may be either excoriated, giving issue to [illegible] and a renewal of the crusts, or dry, and disappearing [illegible] the gradual fading away of the red color of the spots.

*Eczema Chronicum.*—Eczema infantile, if left to itself, [illegible] tendency to cure, but usually becomes chronic, as in the [illegible]

When the disease passes into this form, no matter what [illegible] the original type of the eczema, the eruption gradually [illegible] and characteristic appearances. The various forms which [illegible] been described are then to be regarded as varieties of [illegible] while the chronic form is common to them all and represen[illegible] tion into which all the acute varieties may merge.

The skin in chronic eczema is either very much inflamed [illegible] presenting excoriations with deep cracks and fissures, which [illegible] abundant ichorous secretion, or, more frequently, the inflam[illegible] severe, there being much less heat, redness, and infiltra[illegible] fewer excoriations and cracks, and a smaller amount of [illegible] affected surface is, in these cases, dry and parched, and [illegible] off a fine furfuraceous desquamation, as in pityriasis, or [illegible] cuticle of various sizes, as in psoriasis.

This form is most common on the scalp, behind the ears, in nearly every case, are redness and infiltration of the skin, with marked itching; exudation on the surface, with the forma- usts.

simplex when seated on the hands and between the fingers, nistaken for scabies. The distinction can, however, be made ion to the following points: the vesicles of eczema are flattened egated; in scabies they are acuminated, isolated, and entirely There will also be frequently found, in scabies, vesicles on the re the hand of the nurse from whom the child has caught the ıas been placed to support it. In scabies also the vesicles pre- e red. lines, running off from their margins, and marking the ıken by the acarus; and lastly, in that disease careful search will lways enable us to detect the insect or its ova, which are infal- racteristic of the disease.

sudamina, with which eczema vesiculosum might perhaps be con- , the latter disease may be distinguished by the facts that the constituting sudamina are much larger, that they are discrete and d, that they are associated nearly always with profuse perspira- d that they are unaccompanied by an inflammatory state of the by itching.

na impetiginoides, especially when affecting the scalp, might pos- mistaken for favus, from which, however, it may readily be distin- by the facts that, in the latter disease, the pustules are imbedded pidermis, and that the crusts present a peculiar bright yellow nd are of an umbilicated or cup-like shape.

s is also followed by incurable alopecia and is contagious, and mi- ic examination will detect the peculiar fungus, the achorion, upon t depends, in all of which circumstances it differs entirely from

NOSIS.—Eczema infantile is rarely dangerous to life, though it ıes occasions much distress to the health by the suffering, irrita- d especially by the loss of sleep, which it entails. In one instance, r, that came under our observation, of very severe eczema larvale ed with extensive impetigo figurata, in a child a few months old, ase ended fatally some weeks after the child had been put under rge of a homœopathic practitioner.

ıe prognosis given by the physician, especially in the instance of re eczema pustulosum, he should never forget to refer to its prob- ıg duration, and to its disposition to return even after an apparent s been effected. It often lasts, in this way, for many months, and ıes one or two years or even longer. This difficulty of cure, and te tendency to recur, are often owing to its dependence on some ıtional disturbance, or upon derangement of the digestive system. t, therefore, to be looked upon as the expression of a general dis- and its cure will at times be found to depend upon the removal of stitutional fault.

on this account that the opinion has long been popularly enter- that extensive eczema should not be treated by severe local reme-essential cause of the affection, allay the local distres healthy vigorous nutrition of the skin. These principles practice of most dermatologists, are especially insisted on Wilson, who gives to *elimination* the first place; to *distress* the second, and to *restoration of power* the however, some high authorities who regard the constitut in cases of eczema as of very secondary importance, and clusively upon local measures. Our own observation that the most rapid and certain cures can only be effected combination of general and local remedies, either of which under special circumstances, assume peculiar and param

The general treatment of eczema must depend on the of the patient at the time, on the extent and activity of the on its acute or chronic character.

In mild cases which show but little disposition to exte attended by much irritation, regulation of the child's diet the most simple bland applications will be sufficient.

When the disease is more extensive and attended with it is necessary to examine carefully into the state of the tion, and if this be in any way disordered, to endeavor to more healthful condition.

When the child is teething, the gums ought to be exa found swelled or inflamed, they should be lanced as often The diet must be properly regulated, the food being which has been previously taken is found not to be well digested.

Constipation, if it be present, must be overcome by alter or by the administration of rhubarb, small doses of magne salts, or sulphur. Purgatives have been strongly recommen greenish, and composed in part of mucus, the following prescrip-l often prove very useful:

| | | |
|---|---|---|
| ℞.— | Tr. Krameriæ, | f ʒj. |
| | Tr. Opii, | gtt. vi. |
| | Sodæ Bicarb., | ℈j. |
| | Syrup Zingib., | f ʒvij. |
| | Aquæ, | f ℥ij.—M. |

teaspoonful two or three times a day, for children of one or two years old.

n the eruption has persisted for some time, and tends to become, actually become, chronic, resort must be had to remedies which pable of modifying the constitutional condition of the child. In such cases, the child shows evidences of impaired nutrition, and is and debilitated; so that the remedies clearly indicated are those will tend to invigorate the general health and aid in the restoration wer.

remedy which extensive experience has led us to regard as the useful in all such cases of chronic eczema is *arsenic*. The prepara-of arsenic which is best adapted for administration to children is er's solution; which we are in the habit of giving in combination iron, as in the following formula:

| | | |
|---|---|---|
| ℞.— | Liq. Potassæ Arsenitis, | ♏ xvj ad xxxij. |
| | Vin. Ferri. Amari, | |
| | Syr. Tolutani, āā, | f ℥j. |
| | Aq. Carui, | f ℥ij.—M. |

se.—A teaspoonful thrice daily, directly after food, for an infant from six months ear old.

e have never known any serious inconvenience to follow the admin-tion of this remedy, the only annoying symptoms occasionally pro-d being slight gastric irritation and diarrhœa, and a little puffiness e eyelids. By giving it immediately after taking food and properly ting it, it rarely causes any gastric irritation, and even should it do he symptoms rapidly disappear if the remedy be temporarily sus-ded, or given in a smaller dose or less frequently. The mother or ndant should, therefore, be carefully instructed to instantly suspend dministration upon the appearance of any disturbance of digestion. puffiness of the eyelids, which is one of the earliest and most char-ristic symptoms of the physiological action of arsenic, is of no alarm-import, and the remedy need not be instantly suspended on account s appearance: though it is more prudent, at least, to reduce the dose frequency of administration, and to watch carefully for the occur-e of any further signs of the overaction of the drug.

he period of continuance of this treatment must depend upon the e of the eruption, and the manner in which the arsenic is tolerated; if essary, however, and if it causes no gastric irritation, it may be con-ed for many weeks or months.

n cases which persist despite local treatment and the internal admin-

ful of the latter, three times a day
age.

It is recommended by some auth
able and frequently repeated doses
vises 1 gr. of calomel rubbed down
milk, as the dose for the youngest inf
and a half; for a child two years old
once a week or oftener, according to
ever, found any necessity for emplo
regular treatment, resorting to minut
the stools are whitish or clay-colored
stances it has almost always been pr

The diet should be nutritious and st
light and of easy digestion.

If the appetite is weak and caprici
bark, or quinia, in combination with
ployed, ought to be administered.

In rare cases, where the patient is o
and of florid complexion, the diet mu
moderate use of cathartic remedies, as
blue pill and extract of taraxacum, or

Local Treatment.—In mild cases,
small, and with very little disposition
flammation is slight, a cure may often
the application, twice or thrice a day,
part of ung. hydrarg. nitratis to three
lard; of weak tar ointment; or of the b
as recommended below; or it may even
eruptive patches with cool water several
in the evening with

ghout the day, as they may be found to suit the eruption, and he night may be substituted by a dressing of benzoated oxide of tment.

warm, moist applications, as poultices, are employed, they should be covered with oiled silk to prevent them from drying.

application which we have used with most marked and uniform ge, and which we believe to be the one best adapted to the forms eczema, is the benzoated oxide of zinc ointment,[1] applied in the directed by Mr. Erasmus Wilson.

lirects "that the ointment should be applied abundantly, and distributed upon the surface until every part of the eruption has lete coating; the ointment should be applied night and morning, accidentally rubbed off, or used upon parts exposed to the air iction, it may be repeated more frequently. When once applied, tment should be considered as a permanent dressing to the in- skin, and never removed until the skin is healed, unless special ions arise which render such a process necessary." To secure the nent contact with the skin, he recommends that pieces of linen r a small garment of linen, be kept constantly upon the parts, d with the ointment.

ases where the disease has lasted some time, and the discharge ried, so as to form more or less thick and hard crusts, it is abso- essential to get rid of these entirely before any of the applica- to be hereafter recommended can be efficiently applied. This is ally the case in eczema capitis, when masses of scabs have been d to collect and mat the hair together. The removal of these is best effected by the use of thick, moist, and soft poultices, , when applied to the head, should be inclosed in a fine linen rag, der to prevent the matter of which the poultice may be composed

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[1] e quote from Mr. Wilson (Diseases of the Skin, 7th Amer. ed., 1868, p. 771), ecise directions for preparing this ointment:

*Bell's Formula.*

UNGUENTUM OXYDI ZINCI, BENZOATUM.

℞.—Adipis preparati, . . . . . . ℥vj.
Gummi Benzoini, Pulveris, . . . . ʒj.

uefac, cum leni calore, per horas viginti quatuor, in vaso clauso; dein cola per m, et adde

Oxydi Zinci, Purificati, . . . . . ℥j.
Misce bene, et per linteum exprime.

t be desired to make this ointment rather more stimulating, we may add a little ol, as in the following:

UNGUENTUM OXYDI ZINCI, BENZOATUM, CUM SPIRITU VINI.

℞.—Ung. Oxydi Zinci, Benzoati, . . . . ℥ij.
Spiritûs Vini rectificati, . . . . . fʒij.
Misce, ut fiat unguentum.

tead of spirits of wine, spirits of camphor, distilled glycerine, liquor plumbi tatis, Peruvian balsam, or the juniper tar ointment, may be combined with the ated ointment of oxide of zinc, in the same proportion as above, one drachm to unce.

to give it a slightly greater consistence. Each poultice may
to remain on the part for three or four hours.

After the crusts have been entirely removed, and the inflam-
dition diminished by means of the emollient applications
mended, the latter may be dispensed with entirely, or during
part of the day; or they may be used only during sleep,
they are usually best submitted to by the child. At this
disease it becomes proper to make use of different lotions
intended to modify the action of the diseased skin.

The number of local remedies recommended in the books
its various forms, is however so enormous, that we shall refer
which we have ourselves made trial of and found useful,
from such sources as entitle them to our attention.

The choice between the use of lotions or ointments must
much upon trials made in each particular case, since it will
some are irritated by all, even the mildest ointments, and
only, while in other instances exactly the opposite occurs.

Amongst the lotions, the most soothing and beneficial are
tion of borax containing morphia; weak lead-water; a sulph-
lotion, as the following:

℞.—Potass. Carbonat., . . . . . ʒss.
Sulph. Sublimat., . . . . . ʒj.
Aquæ Fluvial., . . . . . . f℥viij.
Ft. Sol.

Or weak solutions of bichloride of mercury, gr. ss to f℥j, as
liquor:

℞.—Hydrarg. Chloridi Corros.,

r lead or calamine; or citrine ointment, diluted with two or three simple cerate.

the eruption is confined to a rather small surface and is not very d rapid in its progress, or when the activity of the inflammation n somewhat subdued, more powerful local remedies may be em- Among these may be mentioned a saturated solution of borax e acetic acid; stronger solutions of corrosive sublimate; solutions te of silver, of from 2 to 10 grains to the ounce; or such ointments itrine, either pure or mixed with an equal part of lard or simple or, ointments containing protiodide of mercury:

| | |
|---|---|
| ℞.—Hydrarg. Protiod., | gr. xij. |
| Camphoræ, | gr. v. |
| Axungiæ, | ℥j.—M. |

Apply twice daily.

omel:

| | |
|---|---|
| ℞.—Hydrarg. Chlor. Mitis, | ℈j. |
| Camphora, | gr. v. |
| Glycerinæ, | fʒj. |
| Ungt. Aquæ Rosar., | ℥j.—M. |

ntment, or either of the zinc ointments may also be used.

r the activity of the inflammation has been diminished by treat- r by time, and the disease tends to pass into a chronic form, it be- necessary to make use of more stimulating applications than those med. The best of these remedies are those which contain alkaline nces, tarry substances, or mercury.

remedy from which we have obtained the most beneficial effects in ases, is the *spiritus saponatus kalinus* of Hebra, which is prepared olving soft (potash) soap in alcohol (in the proportion of two parts soap to one of alcohol), filtering the solution, and scenting it with s lavandulæ, or any other aromatic spirit:

| | |
|---|---|
| ℞.—Saponis Mollis, | ℥ij. |
| Alcoholis, | f℥j. |

Misce, et cola.

e use of this application it is essential, as directed by Hebra, that p should be firmly rubbed into the eruptive patch by means of a f flannel or a brush, till the accumulated masses of epidermis are d, and a little blood is seen to ooze from the red base which has en exposed.

r ointments and lotions containing alkaline substances are also nended, such as those containing carbonate of potash, gr. xx to xxx f lard (Neligan), or caustic potash, gr. ij to gr. x to f℥j of water. tter application is especially useful in cases where the eruption ined to limited patches, and is attended with much infiltration of in. If the stronger forms of the solution are used, they should, eing applied quickly by means of a brush, be washed off by a large wetted with pure water.

Or, they may be combined with an alkali, as soft soap, as ... tinctura saponis viridis cum pice; which is made by ad... tar to three of the spiritus saponatus kalinus.

The tarry ingredient in these may be either common ta... (oleum cadinum, huile de cade), a product of the dry dist... wood of the *juniperus oxycedrus; oleum fagi*, obtained fr... or *oleum rusci* or *betulæ*, which comes from the bark of the ...

When used in the form of soap, it should be rubbed ... affected surface, or even be allowed to dry on.

The forms of *mercury* best adapted to this stage are the ... protiodide, and the mild chloride, which may be combined ... larger proportion than that recommended for an earlier stag... ease.

In cases of eczema tarsi, attended with infiltration of t... McCall Anderson recommends that the eyelashes should be ... the eyelids everted and a solution of caustic potash gr. v or x ... plied and quickly washed off by a large brush. Care should ... in case the edges of the eyelids are adherent in the morning ... rate them rudely, but to moisten them with tepid water or milk ... so as to soften the crusts. Afterwards an application of citri... diluted with about two parts of lard, should be made along the ... the lids night and morning.

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## ARTICLE II.

### HERPES.

are several different varieties of herpes, which have been well
by Mr. Wilson into two groups, the *phlyctenoid* and *circinate.*
yctenoid group is characterized by the irregularity of form ex-
by the eruption, and includes the variety called herpes phlycte-
nd the local forms, called according to their seat, labialis, nasalis,
alis, auricularis, præputialis, and pudendalis; whilst the circinate
s characterized by the arrangement of the vesicles in circles, and
s the herpes zoster, and iris. Of these different varieties we shall
e, as of importance in children, only the *phlyctenodes*, *zoster*, and
lerpes circinatus, formerly included in this group, will be found
ed in the article on tinea.

PES is quite a frequent disease in children, though one rarely of any
erable importance.

SES.—The causes of herpes are often obscure and uncertain, and
y cases entirely inappreciable. The disease is most common in
s who possess a delicate and irritable skin. The most frequent and
learly ascertained cause is some disturbance of the digestive func-
and when there exist, in connection with this condition, irritations
ammations of the respiratory mucous membrane, it is especially
be developed. Herpes phlyctenodes often follows exposure to a
n, while herpes labialis is frequently caused by exposure to a cold
especially when this occurs immediately after leaving a heated room.
atter variety also frequently accompanies coryza, angina, and stom-
and appears often as a critical eruption in the course, and particu-
at the termination, of fevers, catarrhs, and visceral inflammations.

e usual exciting causes of the disease are irregularities in diet, ex-
e of the body while in a heated state to cold and damp, local irritants,
ilious disorders of all kinds.

RPES PHLYCTENODES.—This variety of herpes, unlike the other forms
e disease, may appear upon any part of the cutaneous surface, and
not assume a determinate shape. It may appear, indeed, upon
al parts at the same time. It is usually, however, met with upon
pper parts of the body, and particularly the cheeks, neck, chest, and
. It is rare to observe it on the lower extremities.

e believe it to be a rare affection amongst the children of families in
circumstances. The only examples that we have seen have been the
t of poisoning by the different kinds of Toxicodendron.

MPTOMS.—The eruption appears in the form of vesicles, usually of
small size, looking like mere points, or attaining sometimes the size
pea, which are seated in groups or clusters on inflamed patches of
kin, varying in size from that of a dollar to that of the palm of the
. Sensations of heat, smarting, and itching, are often felt in the
where the eruption is about to show itself; and within a day, usually,
these symptoms have been observed, or without them, the disease
s its appearance, exhibiting one or more red and inflamed surfaces,
irregular or rounded shape, dotted over with projecting, globular
les, which are hard, resisting, and, on the first day, transparent, but
become, in the course of a day or two, turbid or lactescent. The

or eighth day, they are usually transformed, by the contents, into thin, brownish crusts, which fall off by the tenth or twelfth day. There also remains, for a few disappearance of the eruption, some redness of the surf sides little by little.

This variety of herpes is never accompanied by toms of any severity. A very slight febrile reaction, of appetite, and thirst, are the only ones worthy of note.

**Herpes Labialis.**—This is the most frequent of all the disease. It is, as its name implies, a disease of the lips, seated upon the line of junction of the mucous membr tegument; but it may affect either the former or latter generally confined strictly to the lips, the eruption, in extends to the cheeks, chin, or alæ of the nose.

The disease begins generally with redness, heat, smart tension of the portion of the lip upon which the erup appear. After a few hours, or a day, vesicles begin to upon the inflamed spot, and there is then observed a red shining point, upon which is seated a group of vesicles tion and redness commonly extend some distance bey The latter develop themselves rapidly, until five or six vesicles, filled with a transparent fluid, are seen. The solitary, or several may unite together to form one of After the complete development of the eruption, the burn existed at first commonly subsides. The contents of the become turbid and lactescent, and are converted, by the day, from a serous into a sero-purulent fluid, at which time companying redness and swelling have, in great measure, Soon after this, brownish crusts are formed by the drying of the vesicles, and these drop off usually about the seven day. A slight redness remains for a short time at the point and then disappears entirely.

ng usually, in the form of a cincture, from the mesial line in front me point behind. It may, however, be developed either above the part just named, and, under these circumstances, is apt to owards or down the arm, or towards the thigh and down the leg. e rarely, it has been observed upon the neck, face, or scrotum. some doubt as to which side it is most disposed to attack. The e formed by the eruption is not composed of a continuous line of but is made up of distinct patches of eruption, all following e general direction, but divided from each other by portions of integument. The eruptive patches may be very closely approxi- or they may be separated by considerable spaces of skin un- by the disease.

lisease is acute in its character, lasting, as a general rule, from one e or four weeks.

gles appear first, after some previous smarting and burning in the the form of irregular patches of a vivid red color, more or less separated from each other, and developed, one after the other, ne-half the body is girdled by the eruption. In some instances ease appears simultaneously at the two extremities of the zone, terminated by the gradual formation of successive patches between wo points. Soon after the appearance of the inflamed patches, ous small, white projections can be seen, by careful examination, he red surfaces; these increase rapidly in size, and are soon con- into distinct, transparent vesicles. The vesicles augment in size, rive, in the course of three or four days, at their fullest develop- when they are about as large as small or large peas, or, in some stances, much larger. At this stage of the eruption, the red sur- pon which each group of vesicles is seated extends a slight distance d the patch, thus forming a kind of areola.

er pursuing the course just described during four or five days, each of vesicles begins to subside. The redness of the inflamed patch ishes; the vesicles shrink, and become shrivelled; their contents, were transparent at first, become opaque, and finally they dry up rm small, dark-brown scabs, which fall off about the tenth or twelfth eaving behind reddish spots, which disappear little by little.

constitutional symptoms of herpes zoster consist usually of slight hness, languor, and the signs of gastro-intestinal irritation. The symptoms are pungent and burning pain at the beginning of the on, and more or less severe tension, and sometimes acute pain, in rt upon which the disease is seated, which latter lasts, in some in- s, throughout the course of the disorder, or even for some consider- ime after it has disappeared.

RPES CIRCINATUS.—This variety of herpes has been called also ring , herpetic ringworm, and vesicular ringworm; it will be found de- l under the name *tinea circinata* in the article on parasitic diseases skin.

RPES IRIS.—This is a very rare variety of herpes, one that we have yet met with in children. It begins with small red spots, which the same changes as those described as occurring in the some instances, the vesicles open, and their contents escap thin, and brownish scales, which fall off in ten or twel

Herpes iris may attack any part of the body, but is developed upon the face, hands, fingers, and neck.

According to some dermatologists, as McCall Anders a parasitic disease and merely a form of tinea versicolor.

DIAGNOSIS.—The diagnosis of herpes is seldom attended culty. The small size of the vesicles, their globular shape, their aggregation upon distinct patches of inflamed inte slight degree of constitutional disturbance attendant all render the eruption unlike any other cutaneous affec fore easy of recognition.

Herpes phlyctenodes might possibly be confounded by a observer with pemphigus. The recollection that the erupti gus consists of distinct bullæ, much larger of course than herpes, while that of herpes phlyctenodes consists of nume much smaller than the bullæ of pemphigus, and closely lated red patches, will always serve to distinguish the two might be mistaken also for eczema, when the vesicles of the posed, as sometimes, though rarely, happens, in groups. T may be made, however, by attention to the facts that the vesicles are redder, less elevated, scarcely transparent, and arranged in groups, they are confluent, whilst in herpes they distinct.

Herpes labialis is not likely to be mistaken for any Herpes zoster may always be distinguished by the peculiar assumed by the eruption.

There is but one disease with which herpes iris is likely founded,—roseola annulata. The entire absence of vesicles affection will always, however, enable us to make the distin d, such as sulphur, magnesia, syrup of rhubarb and magnesia, -oil. If the skin be sallow, the tongue heavily coated, the breath the stools scanty and light-colored, or very offensive, small doses pill in combination with rhubarb, or followed by rhubarb and , would be the most appropriate remedy. Excessive or fre- epeated doses of any kind ought to be avoided, as the debility tro-intestinal irritation that so often follow such practice, are urious than the original disease.

ocal treatment of herpes is important, and is, indeed, in many l that is necessary.

s phlyctenodes requires nothing more than mucilaginous lotions, sional warm bath, or the frequent moistening of the eruption with nt made of equal parts of lime-water and sweet-oil. Herpes if it demand local treatment at all, may be relieved by the use of d lip-salve: a very good ointment is one composed of equal parts ard's cerate and simple cerate, with a few drops of glycerine. Mr. recommends the following ointment:

℞.—Unguent. Flor. Sambuci, . . . . ℥j.
Liq. Plumbi, . . . . . . . f℥j.—M.

ng the early stage of herpes zoster, the local treatment should be will tend to allay inflammation and relieve pain. These effects obtained by applying compresses moistened with some kind of ge, such as barley-water, or decoction of flaxseed or slippery-elm r with simple cold water, or with weak lead-water and laudanum. the eruption is followed by excoriations or ulcerations, and the severe, the latter may be allayed by the use of an ointment con- of equal parts of Goulard's cerate and lard, either alone, or con- two or three grains of opium, or half a drachm of the watery ex- opium. Underwood recommends, when the discharge has sub- and the scabs have formed and become adherent, that they should nted twice daily with the ung. hydrarg. ammoniat.

es iris seldom requires any treatment. If any be determined on d consist of alkaline lotions, or of water rendered slightly astrin- the addition of alum, or sulphate of zinc.

## ARTICLE III.

### SCABIES.

NITION; SYNONYMES; FREQUENCY.—Scabies is a contagious erup- the skin, characterized by the formation of papules, vesicles, or s; the vesicles being pointed, generally discrete, and usually pre- small red lines, of one or several lines in length, running off from The eruption is attended with severe itching, and is caused partly presence in the skin of a small insect, called the acarus scabiei, rtly by the scratching which the intolerable itching provokes.

just named.

The disease usually appears in children in from four to the exposure to contagion. In healthy, sanguine children itself within a shorter time,—after two days.—while in feeble and weakly, the period of incubation may be even four of five days.

SYMPTOMS.—The first symptoms of itch appear in the part cause, a contagious contact, may have been applied. In breast, it is usually first developed on the hips and thighs parts that are most constantly in contact with the nurse child, and from whom young children generally receive the older children, the disease commonly appears first on the tween the fingers, and extends thence more or less quickly of the elbows, and to the axillæ and abdomen. It rarely the face in adults; but in children, even this part is not Richard, exempt. (*Trait. Prat. des Mal. des Enfants.* p.

The disease is always attended with severe itching, which causes uneasiness and fretfulness, and in older children ing. The itching is increased by the heat of the bed-cov therefore, most troublesome at night. The eruption appears of more or less numerous vesicles, which are small, discrete, and transparent at the top. The vesicles are at first of a and they contain a viscid, transparent serum. Their number being sometimes very abundant, and at others sparse. They spontaneously, or are soon broken by the fingers or clothes, and by small, thin, slightly adherent scabs. In some instances the nails causes slight effusions of blood, which dry into scabs, like those of prurigo, thus embarrassing, to a certain diagnosis of the disease. Sometimes, particularly when the attendant upon the eruption, or that caused by scratching in length from one or two, to five or six lines. At the point terminates opposite to the vesicle, there is usually to be seen a unded projection, deeper in color than the rest of the cuniculus, which lies the insect. The acarus can often be found at this d removed, by carefully introducing horizontally under the epi- he point of a small needle, and by manipulation so as to take off layer of the epidermis. The insect clings to the point of the and can then be extracted from its lodgement.

umber and extent of the vesicles vary greatly in different subjects. e they are confined to limited surfaces, while in others, and par- y in robust, sanguine children, and in those who are neglected and ctly cleansed, they extend to many different parts, or over the part of the body.

occasions in children much irritability and suffering, and when ed may injure seriously the general health, and cause emaciation bility.

acarus scabiei is an arachnoid insect, varying, according to Mr. 's measurements, between $\frac{1}{147}$ and $\frac{1}{77}$ of an inch in length, and n $\frac{1}{303}$ and $\frac{1}{93}$ of an inch in breadth. It is of a whitish and shining when examined with the naked eye, of a globular form, and is pro- with eight legs, four anterior and four posterior. A most accurate inute account of the structure of the insect is given by Mr. Wilson work on diseases of the skin (7th Amer. ed., p. 739). Besides the , which is found, as before stated, at the extremity, the cuniculus ns a varying number of ova, rarely more than twelve or fourteen; are in addition numerous little oval or round blackish spots, which pposed to be excrement. These ova are about $\frac{1}{300}$ of an inch broad, $\frac{1}{20}$ of an inch in length, though their size varies according to their After the escape of the acarus the shell appears shrivelled, with two n it.

AGNOSIS.—The most characteristic marks of itch are the presence of uniculi and of the insect which causes the disease. If the acarus or a can be extracted from the skin, there will remain, of course, no t; and if the cuniculi be distinct and numerous, the diagnosis be- s almost as certain as when the insect itself is obtained. Before en- ring to detect the cuniculi, it is always advisable to make the patient the part thoroughly.

doubtful cases, it has been recommended by Gull and Hilton Fagge arch for the ova in the crusts or the thickened and undermined le in the neighborhood of the vesicles. In order to detect these, a piece of the crust should be boiled in a solution of caustic soda, ℨss j of water, until it is in great part dissolved; the fluid should then lowed to settle, the supernatant part decanted and the deposit ex- ed, which will, in cases of true scabies, be generally found to contain , ova, or egg-shells.

hen, on the contrary, the insect cannot be found, and when the cu- i are absent or not distinct, the diagnosis becomes more uncertain. liseases with which it is most likely to be confounded are eczema simplex, prurigo, and lichen simplex. From the form be distinguished with certainty by attention to the follo eczema the vesicles are flattened, or globular, scarcely ri surface, and they are collected together in clusters; acuminated, elevated, and either entirely distinct, or than in eczema; in eczema there is a sensation rather itching, whilst in itch the sense of itching is severe and lastly, itch is communicable by contact, whilst ecze tagious.

Prurigo begins with papules, which always remain so prurigo are small and black, consisting of coagulated exude by the rubbing off of the top of the papule: wh scabs are more like thin, yellowish, and friable scales. two eruptions is different. Prurigo is developed up shoulders, and upon the extensor surfaces of the limb pears first about the thighs and buttocks, between the the flexures of the joints. Lastly, prurigo is never tagious.

Lichen simplex is a papular disease, in which the p agglomerated, while in scabies the papules, if present, vesicles, and are discrete. Lichen sometimes affects the then be mistaken for itch; but in the former the erupti sal surface of the hands, while in the latter it appears of the fingers. Lichen is never attended, as itch al pruritus. Attention to these points of difference will al the diagnosis of the two diseases very easy and certain.

When, as sometimes happens, scabies is intermingle tions of the pustular, papular, or vesicular kind, the dia rived at with certainty, only by careful attention to t the detection of the insect. When neither of these cha tions are present to mark the true nature of the disease, remain some doubt as to the diagnosis.

Under these circumstances, however, it is advisable as one of scabies, since the specific remedies for this af injurious, even if they do not speedily cure the eruption.

Prognosis.—Itch is a mild disease, which never dis seriously.

Treatment.—If the inflammation produced by scr severe, it may be necessary to allay it by emollient ap this rarely happens.

In children as in adults, the best treatment for itch is t by inunction. The ungt. sulphuris of the American Ph sisting of one part of sulphur to two of lard, should be the skin before a fire, morning and evening, for two should be kept in a flannel gown, and in bed, during thi the morning of the third day, the skin may be washed and water, or by immersion in a warm bath. This pl effect a cure. Should it happen, however, to fail, the t

Before the application of this or any of the other ointments, ce should be well scrubbed with soap and hot water, so as to nd soften the skin.

increases the effect of the sulphur, to conjoin with it some alkatance, as in the various sulpho-alkaline ointments and lotions, of e following are among the best:

UNG. SULPHURIS CUM POTASSA (WILSON).

| | |
|---|---|
| ℞.—Sulphuris Sublimati, | ℥j. |
| Potassæ Carbonatis, | ʒij. |
| Unguenti Benzoati, | ℥v. |
| Olei Anthemidis Essentialis, | f℥ss.—M. |

*Helmerich's Formula.*

| | |
|---|---|
| ℞.—Sulphuris Sublimati, | ℥ij. |
| Potassæ Carbonatis, | ℥j. |
| Adipis Preparati, | ℥viij.—M. |

*Vlemingkx's Formula.*

| | |
|---|---|
| ℞.—Calcis Vivi, | ℥ij. |
| Sulphuris Sublimati, | ℥iv. |
| Aquæ Fontanæ, | f℥xx. |

il in an iron vessel, and stir with a wooden spatula to a perfect union.

e are all quoted in the proportions directed for adults, which are oo active to be applied to the delicate skin of children; they should re, be diluted one-half at least.

erson recommends the use of oil of cade or tar, combined with the alkaline ointments.

he use of the sulphur ointment is sometimes objected to in private s, on account of its disagreeable odor, various substitutes have ecommended. Mr. Wilson states that he found camphor dissolved in the proportion of one drachm to the ounce, answer every purf eradicating the disease; and Dr. Coley (*Pract. Treat. on Dis. of en*, Phil. ed., 101) speaks highly of an ointment composed of a of iodide of potassium to an ounce and a half of lard, of which a to be applied all over the body, except the head and face, every

ments containing carbolic acid or petroleum are also used with ffect.

use of stavesacre and hellebore has lately been revived, and aply with good success; and Anderson highly recommends an ointmade by melting together one part of liquid styrax, with two of

disease rarely requires any constitutional treatment. If, however, mplication exist, or the general health be deranged in any way, neasures as may be necessary for the removal of either of these ions should be employed, in connection with those proper for the c disease.

DEFINITION; SYNONYMES; VARIETIES; FREQUENCY.— an eruptive disease, characterized by the presence on of the body, of more or less numerous bullæ of consider always isolated, resting upon circular or oval erythemat as large or somewhat larger than the bases of the bullæ bullæ form in the course of a few hours, and contain serum, which soon becomes reddish or turbid; they termin tion and the formation of thin crusts, or by rupture, their contents, when there remains behind a superficial

Authors formerly described numerous varieties of this gave to some of them the title of pompholyx. Of late these have been reduced to a few forms, and we shall conf to those most apt to occur in children. The only variety important in children is the pemphigus acutus. The pem icus, a dangerous and not unfrequent variety in old peop met with in early life, as to make it unnecessary for us Another species of bullar eruption, formerly called pemphig is now more properly classed as rupia escharotica, under shall give an account of it.

Pemphigus is not unfrequently met with in young children the inmates of hospitals, almshouses, and foundling amongst the poor and destitute classes of large cities. Sti said to be a frequent disease.

CAUSES.—The causes of pemphigus are often obscure or preciable. It is usually supposed, however, to depend, in the influence of the act of dentition, on disturbances of the tinal tube brought about by improper food or over-feeding, ral disorder of the nervous system. It is one of the most tions in congenital syphilis (see p. 659), and is not rarely pre in such cases.

SYMPTOMS.—Acute pemphigus

, which increase in size, and soon exhibit a bleb or bulla rising
iddle or over the whole of the red spot. The vesicle commonly
a few hours after the red patch, and consists of an elevation of
le by an effusion of serum beneath it. The bulla rapidly distends
ncrease of the serous effusion, until it attains the size of a pea,
ut, or a large walnut. It is of a circular or oval form, and may
ned to the centre of the erythematous surface on which it rests,
urrounded in such cases by a more or less wide red line of inflam-
or it may occupy the whole or nearly the whole of the red patch,
hich circumstances it entirely conceals the latter, or is surrounded
ry narrow red ring. The color of the areolæ around the bullæ is
ight during the first day of the eruption, while the integument be-
remains perfectly healthy.

fluid contained in the bullæ soon becomes turbid; the bullæ be-
rinkled, and usually burst after one or two days, and are replaced
yellowish or brownish scabs. The crusts begin to form before
dness of the integument has disappeared. In some instances the
do not break, but their contained fluid becomes yellowish in color,
en turbid, it diminishes by absorption, and, at the end of about a
dries into a thin dark-colored scab. The crusts usually fall off in
urse of two or three weeks, leaving the skin beneath of a reddish
but in other respects healthy. The whole duration of the disease
mmonly from one to three weeks, the time in each case varying with
ode of the eruption; when all the bullæ appear simultaneously, sel-
lasting more than one or two weeks; while in cases in which they
r at successive periods, lasting three or even four weeks.

AGNOSIS.—The diagnosis of pemphigus acutus is seldom difficult.
large isolated bullæ, seated on inflamed patches of the integument,
with transparent serum, and followed by thin lamellated scabs, are
e almost any other kind of eruption. From rupia, the other form of
r disease, it is to be distinguished by the smaller number of blebs in
ormer, by their greater flatness, and by the facts that these are fol-
l by true ulcerations, and by thick and prominent scabs.

OGNOSIS.—Acute pemphigus is rarely dangerous when it exists with-
omplications. When, however, it is very extensive, and accompa-
with severe constitutional symptoms, and particularly when it exists
nnection with other diseases, or occurs in a child whose health has
broken down by unwholesome hygienic influences, it may assume a
erous character, and the prognosis should, therefore, always be
ded under such circumstances.

EATMENT.—Simple acute pemphigus requires, as a general rule, no
treatment than attention to diet, and regulation of the digestive
ion. When constipation is present, this should be overcome by
s of simple enemata, or by the use of some mild laxative, as manna,
d syrup of rhubarb, or very small doses of castor-oil. If the dis-
ges be too frequent, they should be restrained by the use of opium
ses proportioned to the age of the child. In young infants, it will
be found that the gastro-intestinal secretions are of an acid and

slow and difficult.

**Diagnosis.**—Rupia is likely to be confounded only with pe ecthyma. Pemphigus is to be distinguished from rupia by th and greater distension and prominence of its bullæ; by th contained fluid of the latter is serous and transparent in stead of being turbid and sanguinolent, as in rupia; by character of the crusts, which, in pemphigus, are thin while in rupia they are thick and rugous; and, lastly, by unhealthy-looking ulcerations that follow rupia.

Ecthyma is unlike rupia in being a pustular disease Moreover, the pustules of ecthyma are surrounded by a areola, which is not the case in rupia, while the crusts in ease differ from those of the latter in being smaller, harder, and more adherent.

**Prognosis.**—Rupia simplex and prominens, though of cure, seldom prove fatal, while rupia escharotica is alw and in very weakly children, especially when these are ex hygienic conditions, very generally ends unfavorably.

**Treatment.**—The most important point in the treatme to the hygienic state of the patient. When the child is li healthy house, or a close and confined room, it should possible, to a more salubrious position, or to a larger and room. The diet ought to be such as to invigorate the stre mote the nutrition of the body. For an infant who is fed food, or who is suckling a nurse of doubtful health, the be the world is a fresh and full breast of milk. If a nurse ca cured, the diet must be most carefully regulated in accorda principles already detailed in full in the article on thrush. While the diet is thus attended to, it is necessary to watch th

weak solutions of alum, copper, zinc, or nitrate of silver. At a
iod of the disease, when the ulcerations are covered with the
ristic thick crusts, these are first to be removed by means of
s of bread-and-water, or flaxseed meal, and the surfaces beneath
ated with the applications recommended above. When the ulcer-
re very obstinate and difficult to heal, they should be modified by
al touchings with nitrate of silver, either pure or in strong solu-
with dilute nitric or muriatic acid.

rd recommends that the ulcerations should be dusted with pow-
lum or cream of tartar, and Rayer also speaks very highly of the
ned application.

Stokes found that the best treatment in epidemic rupia escharotica
ointment of the scrophularia nodosa, made by stewing the small
of the plant in as small a quantity of unsalted butter as may be
nt to prevent their scorching. The ointment is to be warmed
t becomes quite thin, and then applied by means of a brush, after
the surfaces are to be covered with lint smeared with the same
ent. The dressing is to be renewed every six hours.

# CHAPTER IV.

## PUSTULES.

### ARTICLE I

### ECTHYMA.

**FINITION; SYNONYMES; VARIETIES.**—Ecthyma is an eruption char-
ized by prominent, rounded, and usually discrete pustules of con-
able size, with hard and inflamed bases. The pustules are followed
ick, brownish crusts, which leave on their fall a reddish mark, or
rarely a superficial ulcer or a true cicatrix.

thyma has been called also phlyzacia. There are two varieties of
isease to which children are subject, *ecthyma vulgare* or *acutum*,
*cthyma infantile.*

**USES.**—The most frequent causes of ecthyma are the application of
ting substances to the skin, such as croton-oil and tartar emetic
ient, and the presence of other eruptions upon the skin, particularly
-pox, measles, scarlet fever, herpes, or scabies. The causes just
d give rise to the variety called ecthyma vulgare, which, it may be
o state in this place, is of an acute character, and has therefore been
l by some writers ecthyma acutum. The other variety of the disease,
ma infantile, is a chronic affection, and occurs almost always in

into a pustule, filled with a purulent fluid. the pustules varies, but is usually about that of half a pea. is generally surrounded by a hard base of a bright red an areola, while, in some instances, the whole of the red covered by the pustular formation. The pustule remains usually for three or four days, and more rarely for a week. converted, by the drying up of the effused fluid, into a scab, which drops off after a few days, and leaves a spot that remains for some time longer. In other instances breaks and leaves a small ulceration which terminates with trix. The eruption is commonly successive, and is seldom by any febrile reaction.

*Ecthyma infantile* is much more frequently met with variety of the disease, and occurs in a single, or oftener in eruptions, in feeble, badly-nourished, and cachectic children. on the neck, shoulders, arms, and chest, and especially upon extremities. It is often connected with some chronic disorder gestive or respiratory apparatus, and is developed during the bility and exhaustion to which children are reduced by those

The pustules of ecthyma infantile are of variable size, some and others as large or larger than a sixpence. They are and surrounded by an areola of a red or purplish tint; the they contain is generally not very thick, and is of a dark or appearance; they terminate by the formation of a dark crust, by absorption of the contained fluid and a kind of or by a bloody excoriation, or true ulceration, which are deep stain upon the skin or a true cicatrix.

DIAGNOSIS.—Ecthyma is more likely to be confounded with with any other disease. The pustular character of ecthyma very beginning, will, however, almost always enable us to the general health under the influence of which it is produced, m any injury caused by the eruption. The prognosis must de- therefore, upon the state of the general health existing during the of the disease.

TMENT.—In both varieties of ecthyma, attention to the general of the patient constitutes the most important point in the treat- In the acute form, mild laxatives, small doses of some alterative, hydrargyrum cum cretâ or sulphur, the use of a nutritious and ome, and especially of an unstimulating diet, and the local appli- of mucilaginous infusions, or of a mild and cooling ointment, as d's cerate, Turner's cerate, or the carrot, cucumber, or elder-flower nts, with occasional warm bathing, are all that the case demands. ecthyma infantile, the attention of the physician should be directed ls the restoration of the general health, which, as stated above, is more or less deteriorated. As this deterioration depends usually the exposure of the child to unwholesome hygienic influences, and sequent unhealthy state of the digestive and nutritive functions, it primary importance that these should be early attended to. The it ought to be placed in a healthy and well-ventilated apartment; othing must be regulated according to the age of the child, and the n of the year; and, what is most important of all, the diet ought to ich as is digestible, suitable to the age, and, at the same time, shing and strengthening. The internal remedies must consist of s in all cases, and, when the digestive power and general strength educed much below the normal standard, of stimulants. The best lant is old and pure brandy, either given mixed with water, three ur times a day, or combined with the food. The best tonics are, in cases, some preparation of iron, and the one we prefer is the iodide, mixed with syrup of ginger, or, when the bowels are not too irri- , with small quantities of the compound syrup of sarsaparilla, or cod- oil. When, for any reason, iron is not given, quinia, or extract of ona, may be substituted. While these remedies are being employed, ior to their administration, the gastro-intestinal functions ought to refully regulated by the use of mild laxatives when the bowels are tipated, or by some kind of astringent when they are loose and dis- red.

e external or local treatment must consist in the use of mild demul- applications, or of soothing or cooling ointments, during the pustular of the eruption. When unhealthy excoriations or ulcerations follow ustules, these may be brought into good condition by the employ- of weak solutions of nitrate of silver or sulphate of zinc, or of a very lotion of nitric or muriatic acid.

## STROPHULUS.

THIS is a form of papular eruption which some writers
variety of lichen, giving to it the name of *lichen strophulus.*
differs somewhat in its characters from the lichen of the ski
is peculiar to children, deserves a separate consideration.

Strophulus is a disease affecting chiefly infants at the
terized by a more or less extensive, and sometimes a gener
papules, which are whiter or redder than the surrounding
accompanied by more or less irritation and itching.

Its causes are various disturbances of the digestive appar
young infants, and in older ones the effort of the first den

VARIETIES AND SYMPTOMS.—The *strophulus intertinc*
consists of an eruption of prominent pimples of a vivid re
tered here and there over different parts or the whole of
intermingled with small erythematous patches. The er
upon the skin for some time, the papules disappearing and
in successive crops, for a week or two, or more, until they
desquamation. It is most common upon the cheeks, backs
and forearms.

In *strophulus confertus*, the papules are much smaller,
aggregated, much more numerous, and more confluent, than
variety, and they constitute a more severe eruption. It may
uted over the whole surface, but is more commonly limited
spot, or to several regions, as the face, breast, or arms. The
less vivid, but more lasting than that of the strophulus inte
usually reaches its height in twelve or fourteen days, and th

In *strophulus volaticus*, the papules, which are of a vivid
posed in small, not very numerous, circular groups, scatter

symptoms and the extreme mildness of the disease are amongst
f characters. It must be remembered that we only regard such
eruptions as are unassociated with exudation or eczematous
elsewhere on the surface as true instances of strophulus, since
in all respects resembling those of this disease are to be frequently
d in cases of eczema papulosum.

NOSIS.—The eruption is never attended with any danger. If se-
mptoms happen to coincide with it, they must depend on some
auses than the cutaneous affection.

TMENT.—As a general rule, strophulus needs no treatment what-
In infants within the month, the irritation of the skin, if it be such
isturb the comfort of the child, may be allayed by the use of the
ath, and by dusting with some mild powder, or by anointing with
ream, glycerine and cold cream, simple cerate, or cocoa-butter.
any marked disturbance of the digestive apparatus is present, this
be attended to by the administration of mild laxatives, and of
, with some preparation of iron, as the tartrate or superphosphate.
lder children, in whom the disease appears to be associated with
ion, the local means spoken of above may be employed, while at
me time the gums should be lanced, if necessary, and any gastro-
inal disturbance removed by appropriate treatment.

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## ARTICLE II.

### LICHEN.

children the lichenoid eruption takes so constantly the form of stro-
s, that we deem it unnecessary to give a separate description of the
r disease, with the exception of one of its varieties, the lichen tropi-
No doubt cases of lichen simplex do occasionally occur in children
ey approach the age of adolescence, but since the disease resembles
osely in its characters, and requires the same treatment as strophu-
hat has been said in regard to that disease will perfectly well apply
o lichen. Of lichen agrius, a not uncommon and severe form of the
ion in adults, we have never seen an example in a child.

CHEN TROPICUS, OR PRICKLY HEAT.—This is a form of lichen simplex
h occurs principally in hot climates, and during the hot summer sea-
f the more southern temperate climates. It is a very common erup-
at all ages of childhood, from early infancy upwards, in this city,
in most of our Middle and Southern States, and is commonly known
e name of prickly heat.

e chief *cause* of lichen tropicus is apparently the action upon the
neous surface of a high temperature, aided, no doubt, by the dis-
nces of the digestive function so apt to occur under the influence of
condition of the atmosphere. Very warm clothing, and particularly

ance when the eruption is but slight or moderate; [illegible] pious and severe, it assumes a faint reddish appearance [illegible] to the activity of the circulation in the part.

The eruption is most abundant on the parts covered [illegible] rubbed by the edges of the dress, particularly about the [illegible] of the chest, and on the arms and legs. We have [illegible] covering the greater part of the body. It is always [illegible] or less itching, burning, and pricking, which, in [illegible] much fretfulness and scratching, and in those who are [illegible] ness, worrying, and more or less disturbance of the sleep. [illegible] usually remains stationary for several days, and then [illegible] ally without desquamation or other change in the skin; [illegible] and increases, or disappears and returns, with the rise [illegible] the temperature, or without any very evident cause, until [illegible] not to appear again. When the eruption lasts many [illegible] always accompanied by a slight scaly desquamation of the pimples.

The *diagnosis* of this form of eruption is never difficult. [illegible] during hot weather, the character of the papules, their [illegible] abundance, and the entire absence of constitutional [illegible] always render it easy of recognition.

TREATMENT.—Lichen tropicus is usually regarded as a [illegible] tion, and as not therefore to be interfered with by treat [illegible] repel it. In fact, it never needs any treatment, except w[illegible] dant, and when it annoys the child by the heat and itching. Under these circumstances, the skin should be dusted with [illegible] anointed two or three times a day with some mild ointment [illegible] stance, one consisting of glycerine and cold cream or lard, [illegible] ated zinc ointment; or, the child may be bathed once or twice [illegible] warm water containing bran, slippery-elm, or some other [illegible] substance.

ually on the extensor surfaces of the limbs, give rise to the nt and distressing itching, a symptom which constitutes one of narked features of the disease. Wilson includes it among the fections of the skin, and attributes it usually to nervous debility, npaired state of the nutrition and innervation of the skin.

is a rare disease in this city amongst the children of the middle r classes, since we have seldom met with it. In Europe it is de- s occurring in the children of the poor, though it is much less han the eruptive diseases already treated of. Doubtless it occurs untry also, but we have not found any original account of it in s of American writers.

s.—The only well-ascertained causes of the disease are the un- hygienic conditions which exist amongst the destitute classes of —damp and ill-ventilated dwellings, unwholesome food, especially of salted meats and fish, and want of cleanliness as to person and

OMS.—The papules of prurigo are small, but slightly prominent, nded with moderate itching, constituting the *prurigo mitis;* or larger, more projecting, and attended with the most violent pru- rming the *prurigo formicans.* The papules are usually of the the skin, except when they have been torn by the nails, and are ly seated upon the outer surfaces of the limbs, and the upper part runk.

n the itching is severe, the tearing of the papules by the nails the escape of a small drop of blood from the tops of many of them. od dries and forms so many small black crusts crowning the sum- the papules, a peculiarity which constitutes one of the most dis- e features of the disease. The papules terminate by absorption or ight desquamation.

*duration* of the eruption is very uncertain. In acute cases, when ly treated, it may end in a few weeks, though it often, and indeed generally, lasts for several months.

GNOSIS.—The only diseases with which prurigo is likely to be con- ed are strophulus or lichen. It may be distinguished, however, lly with ease, by the facts that the papules of prurigo are larger, merous, and more extended, than those of strophulus or lichen; n the latter diseases the papules are never crowned by the small crusts of prurigo, and they are never attended with the same vio- ching as the former.

GNOSIS.—Prurigo is never perhaps a dangerous disease, though y a very troublesome one from the severe irritation which attends m its not unfrequently obstinate resistance to treatment, and its ition to relapse.

ATMENT.—The internal treatment of prurigo in children should t in the use of sulphur, given alone or in combination with mag- of demulcent drinks, of mild laxatives when there is constipation, such remedies as may be rendered necessary by any disordered of the digestive function. The diet must be carefully regulated.

To allay the cutaneous irritation mild found useful. Billard employed with success, in a innunctions with the oil of sweet almonds. Soaps or juniper tar or carbolic acid, are excellent antiprurigin and relief will frequently be obtained from the applicati lution of chlorinated soda. When the case is obstinat lient and alkaline baths, sulphurous baths must be ma

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# CHAPTER VI.

## SQUAMÆ.

THE various forms of scaly disease, psoriasis, pityriasis are so much more rare in children, and therefore so much practically, than the various eruptions we have thus far we deem it unnecessary, in a work limited in extent like a detailed account of them. We shall make merely a few on each, referring the reader, should he desire further inf special treatises upon diseases of the skin.

PSORIASIS is, in our experience, a very rare disease in chil we have met with a few cases of it. It is met with in *psoriasis diffusa* and *guttata*, of which the former is said frequent.

*Psoriasis diffusa* appears in the form of patches of rath very variable size, of irregular shape, and covered with dried epidermis, which are constantly falling off and be When the scales are removed, the surface of the eruptive to be of a dull red color, somewhat rough, and raised above

iety, *psoriasis inveterata*, a severe, obstinate, and inveterate
et with in adults, is very rare, if not unknown, in children.
T.—In recent cases psoriasis is to be treated with simple
or emollient baths, and with mild liniments or ointments,
f sweet almonds, glycerine alone, or glycerine mixed with
or simple cerate. In more chronic cases the local treatment
ne which promises any certain success. The particular mode
atment which we have found most successful is that recom-
Hebra, a short account of which will be found in our remarks
ment of chronic eczema.

olic acid soap, dilute citrine ointment, or weak solutions of
ash when there is much infiltration of the skin, are all service-
chronic form of the disease.

ases the digestive function must be carefully attended to, any
hat it may present being removed as rapidly and effectually as
y the proper remedies.

where the eruption persists despite the use of local applica-
attention to the digestive functions, the child should be placed
use of the ferro-arsenical mixture.

asis is a slight scaly disease, which may attack the head only, or
other parts of the body. In children, however, it is generally
o the scalp, and may be recognized by the existence on the part
rable small, thin, whitish, furfuraceous scales, which form a
icker covering for the scalp, in proportion to the amount of care
on the cleansing of the head. The scales of epidermis are easily
f, and the surface beneath is rarely found to present even the
inflammation.

disorder of minor importance, and seldom requires other treat-
some mild lotion or ointment, and strict cleanliness. When,
it persists, the child should be placed upon the use of the ferro-
mixture internally, and applications of dilute citrine ointment
made to the patches of eruption.

osis is an eruptive disease in which there appears on various
usually over the larger portion, of the skin, epidermic patches
e, that are hard and dry, and of more or less considerable size.
es are generally of a dirty gray or earthy color; they exfoliate,
the skin beneath a little thickened and roughened, but never
The disease is unattended with either heat, pain, or itching.
arily congenital, lasts many years, and, according to MM. Caze-
Schedel, is incurable.

recommends, however, in the ichthyosis of new-born children,
warm and emollient baths, frictions with oil of sweet almonds,
il, acidulated drinks, and perfect cleanliness.

**General Remarks.**—The diseases now regarded by [illegible] as due to the presence of a vegetable parasite upon the [illegible] lows:

1. Tinea Favosa or Favus, . . . . . . . . . . . . Parasite: [illegible]
2. Tinea Tricophytina, { Tinea Tonsurans (Ringworm of scalp), Tinea Circinata (Ringworm of body), Tinea Sycosis (Ringworm of beard), } [illegible]
3. Tinea Versicolor (Chloasma, Wilson), . . . . . . . . . " [illegible]
4. Tinea Decalvans (Alopecia Areata), . . . . . . . . " [illegible]

There are several questions, however, in regard to these [illegible] which doubts still exist, and which are of so much [illegible] mand a brief examination.

In the first place, it can scarcely be doubted by any [illegible] the use of the microscope, and who has taken the trouble [illegible] subject, that parasitic fungi are found with remarkable [illegible] the eruptions of these diseases. The opinion advanced by [illegible] *and For. Med.-Chir. Rev.*, 1864, and *Diseases of the* [illegible] p. 614), that the structures found in these cases, are due [illegible] "granular" degeneration of the normal elements of the [illegible] which they lose their power of developing into healthy [illegible] tures, but retain their power of proliferation, appears to us [illegible] sound reason and accurate observation.

In addition, however, to the evidence furnished by the [illegible] microscopical examination of the growths in question, [illegible] nature is shown by the facts that they can be cultivated [illegible] al alterations which the hairs undergo will be detailed under the different diseases; the fungus gains entrance to the fol- ates the bulb of the hair, insinuates itself between its longi- es, thus splitting it up and rendering it brittle. In the epi- fungus is said at first usually to appear beneath the superficial by its development it causes such irritation as leads to the of this layer, when it reaches the surface and then multiplies

ection which has been based upon this fact, that the growth a parasitic one, does not seem to us of much force, since it is count for the introduction of such extremely minute bodies as of these fungi beneath the superficial layer of the cuticle.

ng then the presence of these parasitic growths, a more in- question arises in regard to the relation which exists between the diseases with which they are associated; whether, that is, ssential to, and actually the causes of the respective diseases, or y accidental, and are present only because they find a suitable development in the diseased skin. Opinions are at variance upon tion, but there are at least two considerations which render it that the fungi are essential rather than accidental productions. of these is, that they are present in the early stages of the dis- fore any considerable inflammatory change has occurred, and proportion as suppuration ensues they diminish in abundance. ondly, that, as already stated, they are capable of transmission to healthy persons by inoculation.

can, however, be no doubt that the development of the fungus, rdinary circumstances, is greatly favored by the constitutional n of the patient and the state of the cutaneous surface. Thus it ally in children of a delicate or strumous constitution, that these diseases are most frequently met with; and when, in addition, filthiness with inattention to properly combing and cleansing, and changing the clothing, are combined, the spores find the orable conditions possible for their rapid development.

remains the further question, upon which authorities are still whether there are various fungi concerned in the production of eases, or whether the apparently different species are merely dif- ages of a single fungus. For the sake of greater ease of reference parison we will here give a brief description of their character- earances.

*s of Favus.*—In the earliest stage of development of the favus is still covered by the superficial layer of epidermis; but later, s is ruptured, it still presents an envelope of a sulphur-yellow color, microscopic examination shows a homogeneous or finely granular e. The interior, of a pale white color, is the true favus matter, sists of the sporules, thalli, and mycelia of a fungus named the Schœnleinii, in honor of Schœnlein, who first fully described it. porules are of a rounded, or more frequently of an oval form, and ll-marked edges, and a homogeneous and slightly opalescent in-

T[illegible] present number is [illegible] present and the influence of the sp[illegible] present [illegible] branches. These [illegible] and are either empty [illegible] An[illegible] the sp[illegible] and mycelia, espe[illegible] [illegible] perfectly developed spores.

The next [illegible] Dermat[illegible] [illegible] and [illegible].

[illegible] characteristics of this parasite [illegible] Ma[illegible] and which [illegible] by number [illegible] are [illegible] [illegible].

A[illegible] which by many [illegible] [illegible] [illegible] spores [illegible] spores are [illegible] in [illegible] large clusters, like bunches of grapes. [illegible] are simple and [illegible].

[illegible] the parasitic nature of [illegible] warm a supporter of the [illegible] as we have [illegible] as Dr. An[illegible].

N[illegible] have been made [illegible] of a [illegible] range of variation as regards [illegible] observers [illegible] assert [illegible] [illegible] refer all varieties of [illegible] single type.

[illegible]

luce these diseases, are essentially distinct. The arguments h they base this opinion may be briefly expressed as follows, in ge of Dr. Anderson (*loc. cit.*, p. 170).

all cases of successful inoculation with the achorion, tricophyton sporon furfur, the same parasitic disease has been produced as which the parasite was taken. That of the innumerable cases in the human subject, illustrative of the contagious nature of ea tonsurans, and tinea versicolor, there is no authentic case in e of these diseases gave rise to one of the others.

ie difference in the appearance of the eruptions, when fully de- is so very striking as to lead to the belief that they are produced ate parasites.

here is no authentic record of the transition of one of these dis- o one of the others.

the microscopic differences between the three fungi are in many fficient to base a correct diagnosis upon.

of the numerous instances on record of the transmission of tinea nd tinea tricophytina, from the lower animals by contagion or in- n, favus has always given rise to favus, and tinea tricophytina to cophytina.

gard then the parasitic nature of these affections as undoubted, e extended observation is necessary before the relations of their ve fungi can be determined.

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## ARTICLE I.

### FAVUS.

is a peculiar disease of the scalp, long confounded by different with other and very dissimilar affections of that part. In conse- f this confusion it has received a great variety of names, of which generally known are porrigo and tinea. In adopting the above follow the example of Erasmus Wilson, amongst the English, and Rilliet and Barthez, Gibert and Rayer, amongst the French.

ITION; SYNONYMES; VARIETIES; FREQUENCY.—Favus is a spe- tagious eruption of the scalp, characterized by inflammation of follicles dependent upon the presence of a peculiar fungus, the Schœnleinii. It is characterized at first by small yellow pustules, unk in the skin; these are soon converted into yellow cup-like hich adhere often for a very long period. It usually causes per- loss of hair at the affected part.

isease is described by most of the English writers under the title go, but as several other eruptions have been included under the me, we think it best to follow the example of Mr. E. Wilson, and vus. By MM. Biett and Cazenave it is designated, after Willan, upper classes, at least of this city, is almost unknown. never met with a case of it in our own practice, though we ally seen it in the hospitals here.

Causes.—The only well-ascertained exciting cause of thought to be *contagion*, a quality of the disease acknowledged servers, though denied by Mr. E. Wilson, who considers bility of nutritive vitality, allied with struma. It may direct contact of the diseased with a healthy skin, or by brushes, or other articles of the toilet; and it is also spores may be carried by the atmosphere so as to fection. It has been frequently propagated by direct Remak, Bennett, Hebra, Bazin, Gruby, Köbner, &c.

Favus is also said to be met with in the lower animals, amongst mice and cats; and cases are on record which probable that it may be communicated from them to the

It occurs at all seasons, attacks either sex indifferently, at all ages, but is especially frequent in children and young indeed, when met with in adults, is usually found to have early life, and to have persisted for years. Certain conditi disposing causes in its production, and may alone, perhaps its development. These conditions are unhealthy hygienic unwholesome and insufficient food, poverty, filth, and the damp, and ill-ventilated dwellings. It is met with most persons of feeble, lymphatic, and especially in those of stitution, though, be it remarked, it occurs also in persons vigorous health.

Among those who believe in its truly parasitic nature, there as Devergie, who believe that it may be spontaneously parasite originating in the body of the affected person. One upon which this theory is based, is the asserted occasional disease by internal remedies, but we believe that these cas it, by fortifying the

tly evident. Each pustule, and of course each crust is, as a
le, traversed by a hair. The favous crust is a very remarkable
the disease, and is in itself a pathognomonic symptom. As it
in size, which it does gradually until it reaches in some in-
diameter of half an inch, the central depression above spoken
s more and more distinct, and the crust assumes, from this cir-
e, the shape of a cup with an inverted edge. This cup-like form,
iar straw-yellow color, and the fact that each crust is usually
y a hair, are the distinguishing characters of the disease.

istules are usually isolated at first, though they may be arranged
s of irregular size. When numerous, the crusts, by their gradual
ient, touch at their edges, and blend into larger or smaller patches
ılar shape, but still presenting many little depressions correspond-
ıe first-formed pustules. In rare cases, the disease is so extensive
m a kind of mask covering the whole scalp.

ı the disease is not interfered with by treatment, the crusts remain
ıt for a long time,—for months or even years; they become also
color than they were at first, and so dry and pulverulent, as to
very readily when rubbed or touched. They become, moreover,
and more massive, and lose their first regular cup-like form, from
appearance of their depressions, and from the irregular and uneven
given to their edges and surfaces, by the breaking which they
go. When the case runs on in this way, the head exhales a most
sant odor, which has been compared to that of mice or the urine of
McCall Anderson has, however, noticed a very similar odor in cases
ma impetiginoides of the scalp. In some instances, where the dis-
grossly neglected amongst the very poor, pediculi form in abun-
amidst the crusts, and add to the disgusting appearance of the dis-

en the crusts have been removed by any means, the surface of the
s seen to be red, moist, and to present slight erosions or even ulcera-
The crusts are reformed only by the eruption of new pustules.

invariable and unfortunate sequel to the favous disease is a more
s extensive loss of the hair. The hairs become loose from a very
eriod of the disease, and can be pulled out with great ease. As
se goes on they fall out, and the scalp is left smooth, shining, un-
ınd deprived of hair. On these spots the hair seldom grows again,
it does, it comes out thin, woolly, and with every appearance of
ess and unhealthfulness.

ugh the usual and favorite seat of favus is the scalp, it is met with
onally on the forehead, temples, chin, and eyebrows, and, in still
instances, on the shoulders, elbows, forearms, on the upper and
parts of the legs and thighs, on the scrotum, and even on the nails.
in such cases, however, it has generally existed first on the scalp,
xtended thence to the other parts, though it may sometimes begin
the trunk or limbs in consequence of a direct application to them
contagious element.

us Confertus, or Porrigo Scutulata.—In this variety of favus

ease to the follicles just beyond its outer edge. The p
like those of favus dispersus, except that their yellow
tint. They desiccate very rapidly, and form crusts which
at first, never very thick, and of an irregular shape.

When the disks are very numerous, either originally,
tion of the disease from part to part, they meet at their
together, and give to the scalp the appearance of an exten
lar crust, presenting at its circumference curved lines, ma
ments of circles of which the whole is composed. The
times covered the whole scalp, excepting merely a small
circumference, where may still exist some scanty remains

When the crusts are removed the surface beneath is
and tumid, according to Wilson, and to present numerous
Cazenave and Schedel state that when the crusts fall, they
a large, uneven, furfuraceous patch, upon which new fav
not appear for a long time often. The hair is in great mea
over the diseased surfaces, though not so completely, it is
other variety.

Favus is not, in either variety, attended with constitution
The only marked local symptom complained of is the it
always greatly aggravated by want of cleanliness.

NATURE OF FAVUS.—We have already, in our general
ductory to this class of skin diseases, given the arguments
their parasitic nature.

Mr. E. Wilson, alone among dermatologists of note, pe
ing favus and the others, as mere alterations in the nutriti
dependent upon constitutional nutritive debility; and he re
acteristic fungous elements revealed by microscopic examin
to a peculiar granular degeneration of the epithelial elements

We refer the reader, for a more full discussion of this
the works already quoted, merely adding here that, in our
results of microscopic examination, the results of inocul

ar pustules which exist at first—small, yellow, on a level with
he surface of the scalp, and the crusts which so soon follow
on-yellow in color, dry, and cup-shaped, will mark a case of
ersus from every other disease. In favus confertus the same
exist, but the crusts and pustules are arranged on circular
ous disks, instead of being isolated or dispersed as in favus

npetigo of the scalp, which is the only disease with which it is
bable that it would be confounded, it may readily be distin-
y an examination of the primary characters of the two disorders.
nary character can always be found by searching at the outer
the diseased surface. In favus the pustule is small, depressed,
ains very little fluid, while in impetigo it is large, globular, and
g. The crusts are very different: in the former dry, as though
ith sulphur, cup-shaped, depressed, and usually traversed by a
the latter, rugous, irregular in shape, not cupped, resting above
, and generally somewhat moist and soft. The microscopic ex-
on of the hair or crusts in favus also shows the presence of the
Schœnleinii, which is never met with in impetigo. Lastly, the
which so constantly results from favus, does not occur in im-

osis.—Favus is a serious disease because of its usually long dura-
difficulty often experienced in effecting its cure, and because of
of hair which it occasions.

tment.—The treatment of favus should be both general and local,
gh some writers, and particularly Cazenave and Schedel, state
ust be altogether external, and that in spite of numerous trials
not feel authorized to propose any internal means (*Malad. de la*
me ed., p. 326); others, as Wilson, Bennett, and Neligan, recom-
nstitutional remedies as of very great importance in assisting the

*eneral* treatment must be such as may seem called for by the
health of the individual patient. When, as so often happens, the
occurs in a scrofulous person, cod-liver oil, iodide of potassium,
ng food, air, and exercise, are of the utmost importance. When
th of the patient is feeble and broken from the want of wholesome
ndant food, from insufficient clothing, or from residence in a
, close, and confined air, the removal of these conditions, which
edly act as predisposing causes in the production of the disease,
out aid in its cure. Dr. Neligan (*Dublin Quart. Journ. of Med.*
l. vi, p. 56) recommends very highly the use of the iodide of
as a constitutional remedy. He states that it may be given with
test safety to the youngest child, "its effects being, of course,
tched." The dose for a child six years old is one-fifteenth of a
nd, for a younger one, from one-eighteenth to one-twentieth of a
hree times a day. Dr. Neligan speaks, however (*loc. cit.*, p. 62),
ituting the yellow iodide of mercury for the iodide of arsenic in
of a child three years and a half old, being afraid to give the

of unguentum hydrargyri ammonio-chloridi, and unguen
He states that a cure may usually be effected by this pla
four weeks.

Under any plan of treatment, a complete cure is rarely
than from four to eighteen weeks; the disease is extremely
there is a strong tendency to the redevelopment of the par
cessation of the local treatment, until it be completely era
persevering in the plan above recommended, however, this
be effected, and a perfect cure obtained, with the exceptio
of baldness, which but too frequently follow, from the destr
hair follicles.

## ARTICLE II.

### TINEA.

We have already, in our general remarks introductory to th
stated our belief that the various forms of tinea or ringw
tagious diseases, and due to the presence of a peculiar fung
phyton.

The ordinary varieties of tinea which are described, are tinea
or ringworm of the scalp; tinea circinata, or ringworm of
surface; and tinea sycosis, or ringworm of the beard. With
form, of course, we are not at present concerned, nor are its
the two other varieties indisputable, since opinions are still div
its contagious and parasitic nature.

There is, however, abundant reason for believing the essentia
of tinea tonsurans and tinea circinata. In addition to the
microscopic examination, which

luence the production of the disease, is by favoring the more
th of the parasite. In like manner, dirtiness of every kind
l to be a predisposing cause.

ience of these is, however, trifling, and we have frequently
he disease among families living in easy or very affluent cir-
s, the children of which were perfectly well lodged, well clothed,
d, and to whom every attention required by the nicest clean-
given. The means by which the affection is communicated are
rushes, combs, caps, &c., or by the direct contact of the dis-
aces.

is has but lately had an opportunity of studying, on a large scale,
ctions and the mode of their transmission, at a large Children's
this city. There were a considerable number of children, about
all, affected with the disease in a severe form; by strict isola-
he utmost care in preventing any use of their combs, brushes,
clothing, by the other children, by covering the entire scalp with
silk cap, whenever they mingled with their comrades, the disease
ented from spreading. It was, however, frequently observed, that
ildren who suffered with tinea tonsurans of the scalp, patches of
cinata would appear either on the neck or face, or on some part
ould be brought in contact with the affected surface; and its
ontagious nature was unhesitatingly believed by all the atten-
ho had indeed themselves furnished the strongest evidence pos-
it, by each and all contracting the disease repeatedly from hand-
children in dressing them, or in making applications to the
parts.

xercises a marked influence upon the production of these diseases,
nsurans being confined to childhood and early youth, most com-
ccurring between the ages of three and twelve years; though
cinata may be met with at any age.

TONSURANS—SYMPTOMS.—Those who regard this disease as a
of herpes, describe its first appearance as a ring of minute ves-
is, however, is not essential, and the disease most frequently
ith little erythematous patches which increase circumferentially
ey heal in the centre, leaving the skin more or less furfuraceous.
lly established, the disease appears in the form of furfuraceous
of oval or circular shape, which are at first not more than $\frac{1}{8}$th or
n inch in size, but which increase gradually until they attain a
of one or two inches, and seldom more. The diseased surface
ly thickened, elevated, of a grayish, bluish, or slate color, and
with fine dry scales, which are very easily rubbed off, and quickly
after being removed by any cause.

airs are altered from the very first. In the early stage the aper-
the follicles of the diseased hairs are generally more or less
nt or papillated, and the hairs are unnaturally brittle, dull,
, and are bent on themselves and twisted, so as not to lie
and the roots are somewhat matted together by the furfuraceous
A little later, they break off at a short distance from the diseased

on examining the hairs, the same penetrating into the bulbs and shafts between the causing here and there, by its accumulation, swellings shaft.

The disease is unattended by any local sensations, rate degree of itching.

If the disease persist and the degree of inflammation may be a good deal of infiltration of the scalp, and tumid, and dotted with enlarged orifices of hair follicles, an eruption of vesicles or pustules, which dry and form crusts.

Diagnosis.—This disease is easily distinguished from the scalp. The appearances it presents when fully unlike those of favus or eczema impetiginodes capitis. culiar cup-shaped crusts and the presence of the spores are sufficient to prevent mistakes; while in eczema, the pustular, with the formation of yellowish or brownish patches are not circular, the hairs are healthy, the and finally the disease is not contagious; in all of differs entirely from the eruption of ringworm.

Pityriasis capitis does not occur in circular patches, whole scalp; it is not parasitic nor contagious, and does much alteration of the hairs.

Occasionally tinea tonsurans, either from the irritation or some other cause, may be associated with eczema to a great extent obscures the former disease, though will usually detect some of the characteristic broken loaded with the parasitic growth.

Prognosis.—Ringworm of the scalp is entirely devoid is an exceedingly troublesome disease, as it is apt to children, and is often very difficult of cure. Its duration nite, and it not rarely leads to

cases, minute vesicles form on the reddened inflamed ring.
the usual course of development, being at first transparent,
and finally drying into small thin scales.

of the patch varies greatly, being in some instances small, not
a shilling, and in others presenting a diameter of two or three
when small, the redness covers the whole of the patch, but is
r in the centre than at the circumference; when large, the
ins the natural color of the skin. Usually the ring is exactly
it at times it assumes an oval shape.

hairs have been growing on the affected spot, they become
changed, as before described. There are usually several such
sent, and in some cases they are formed in great numbers.

symptoms accompanying the eruption are slight pricking,
and itching in the part.

sis.—There are but few diseases with which there is any danger
nding tinea circinata. It is distinguished from erythema circi-
the greater elevation of the marginal ring, by the presence of
ite, and by its contagious nature; and the two last peculiarities
distinguish it from psoriasis circinata.

ding to McCall Anderson, and some other dermatologists, herpes
erely a form of this affection.

MENT.—The cases of tinea tonsurans that have come under our
have proved in many instances very rebellious to treatment.

attention should always be paid to cleanliness and hygienic
d, if the disease be associated with any impairment of the consti-
od-liver oil, iron, in the form of the syrup of the iodide in syrup
arilla, arsenic, and bitter tonics should be administered.

ocal treatment is, however, the most essential. Where the dis-
urs on a part covered with hair, epilation is advised by some
ies, and it would in all probability facilitate and hasten the cure.

g the local applications which have proved most useful to us have
phuro-alkaline lotions, composed of ʒj of subcarbonate of potash
of sulphur, to a pint of water, applied by washing with a sponge
imes a day; strong solutions of sulphite of soda; and an ointment
g of ʒj of muriate of ammonia, mixed in an ounce of sulphur
t, applied first at night by inunction, and after a time on rags.

ine remedies have also been much used by other observers, who
end washing the scalp every morning with a lotion composed of
r xl of carbonate of potassa or borax to a pint of water, and apply-
e evening an ointment containing ℈j of tannic acid to ℥j of lard.

more stimulating applications are, however, highly recommended,
n prove very serviceable. Thus Mr. Wilson advises a single ap-
of the acetum cantharidis, or the stronger acetic acid; and De-
ecommends a solution of nitrate of silver, ʒj to f℥j of water.

us mercurial applications are also advised, as solutions of corrosive
te, the citrine ointment, or the following, recommended by Jenner:

℞.—Hydrargyri Ammonio-Chloridi, . . . gr. xx.
Ung. Sulphuris, . . . . . . . ʒiv.

whalebone. It is allowed to
until the cuticle and the black crust separate at the
ten days.

In cases where many patches are present over the
to employ mercurial or sulphur vapor baths.

It must not, however, be forgotten that these
among the most obstinate disorders to which children
most faithful trial may be made with the remedies
for a long time, without success, and it is often
their use for months; conjoining the treatment with
and, when possible, with a change of residence, before
be entirely and permanently cured.

CASES.—The following cases may be taken as types of
form of tinea, after it has persisted a long time and
with secondary eruptions of eczema or pityriasis. It will
in the following records, all of the patients are stated to
edly scrofulous; but this circumstance must not have
tance attached to it, since in the Home where these cases
every one of the children presented unquestionable marks
diathesis. There can be no doubt, however, that this
stitution strongly favored the development of the disease
more severe and obstinate, and also favored the occurrence
dary inflammatory eruptions.

George T., æt. five, scrofulous, admitted to Home in
ing piles. Tinea tonsurans appeared two months after
persisted with various fluctuations for eighteen months,
complicated with eczema impetiginodes. Applications of
sive sublimate have been chiefly relied on.

Nov. 30th, 1866. Scalp covered with grayish-yellow crusts
inch thick, in places running together or forming isolated
spots of tinea circinata on face and neck. The scalp is
there is very little discharge from it.
The cervical

## ARTICLE III.

### ALOPECIA AREATA.

This affection, which is also known by the name of [illegible] decalvans, is characterized by the loss of hair in [illegible] of round or oval shape. It is by no means a rare [illegible] more common in children than in adults; thus of 42 [illegible] chinson, 28 were under fifteen, 14 above that age.

CAUSE.—There is still much doubt as to the essential [illegible] of alopecia areata.

Gruby is said to have discovered in 1843 a fungus in it, [illegible] called the microsporon audouini, and some dermatologists [illegible] thority, accept its parasitic nature. It cannot, however, [illegible] demonstrated, since the parasite is very rarely found; [illegible] son, who has made numerous microscopic examinations, [illegible] ceeded in detecting it.

Wilson considers it as due to suspended innervation, [illegible] sis of innervation.

The disease appears to be, at least in some instances, [illegible] contagion; though it certainly possesses this property [illegible] gree than either of the forms of ringworm.

SYMPTOMS.—The disease is limited to the scalp in [illegible] adults it may attack any hairy part. In some cases, [illegible] of the existence of the disease is the sudden discovery [illegible] in others, though less frequently, there is slight itching, [illegible] branny desquamation of the affected spots.

The bulbs of the hairs then atrophy, and become [illegible] being rounded and club-shaped; the hairs themselves [illegible] less, and brittle, with a fibrous fracture, and rapidly fall out, [illegible] patches.

These patches vary in size [illegible]

excepting in the comparatively rare cases when it is com-
ier skin diseases, as eczema or pityriasis.
—The only danger attendant upon alopecia areata is that
which is, in some cases, very great, depending of course
nt of the disease and the stage at which it is brought under

ches are small, the scalp not materially atrophied, and the
air follicles still visible on the bald patches, there is good
pe that steady persistence in treatment will effect a cure.
NT.—Those who regard this as a parasitic affection, advise the
the hairs immediately surrounding the patch, and the applica-
e of the stimulating parasiticides recommended in the article

ority of authors, however, content themselves with the applica-
of such stimulating lotions and ointments as will increase the
f the affected spots, and favor the renewed growth of hair.
the ointments which are most highly recommended, are those
the red iodide, the nitrate, the ammonio-chloride of mercury;
of sulphur; or tar, iodine, or cantharides.
ecommends, as the treatment he has found most useful, the ap-
t long intervals of acetum cantharidis to the bald patches;
em every other day with tinct. iodine, washing the head twice
h soap and cold water, and applying a wash (consisting of one
n, one ounce of tinct. cantharidis, one-half ounce of spirit. am-
mat., and ten ounces of water) to the parts of the head which are
wice a week.
t of this local treatment will be much increased by the internal
tion of arsenic and iron.

## SECTION II.

### ARTICLE I.

### SCLEREMA.

**ION; SYNONYMES; CAUSE; FREQUENCY.**—This peculiar affec-
cterized by induration of the skin and subcutaneous tissue,
thout œdema, has been described by numerous writers, almost
f whom has given a distinct name and theory for the disease.
ese names the most appropriate are sclerema, scleriasis, sclero-
luration of the cellular tissue, or chorionitis.
affection not altogether peculiar to infants, though it is rare to
developed after the first few months of life. There are, how-
cient number of cases in adults on record to establish the fact
sional occurrence at all ages. It must be a very rare disease

by Elsaesser, all but 4 proved

the sclerema itself, or from some incidental disease.

Diagnosis.—The absence of any lesion of the internal
with the perfectly characteristic appearances of the indurat
error of diagnosis almost impossible.

Anatomical Appearances.—The induration of the surfa
after death, and on incising the part, a turbid fluid, res
anasarca, often flows out. The subcutaneous tissue is als
and the fat is found in the form of solid granules. This
varies from one-half a line to three lines in thickness, is
lowed by a gelatinous one.

The fluid which is contained in the meshes of the tissues has
jected to analysis by several observers, but with conflict
Chevreul and Breschet reporting that it contained a plastic
taneously coagulable on contact with the air, which they were
regard as characteristic of the disease; whilst Billard, on rep
observation with fluid derived from an ordinary case of anasarc
to possess the same property. This subject, therefore, of mu
tance in regard to the pathology of sclerema, requires to be
investigated.

The indurated tissue is traversed by numerous vessels, perm
for the most part gorged with dark blood. Bouchut believ
cutaneous capillaries are in great measure obliterated in the
parts, and that the œdema which occasionally coexists with
due to this obliteration; founding his opinion upon an unsucc
tempt to inject the skin of a limb affected with sclerema, sh
injecting fluid freely entered all the deeper tissues. The observ
Elsaesser, however, render this view doubtful, since in 49 cases
to find this condition.[1]

Apart from these morbid changes in the skin and subcutaneous
there is no lesion characteristic of sclerema. In a large number
however, the lungs present some abnormal condition.

f lobar pneumonia; conditions which he regards rather as the n the cause of sclerema.

ser found lobular pneumonia present in a tenth of his cases; and of them, portions of the lungs were impermeable to air. We ady stated that West, following the researches of Bailly and on atelectasis, believes that sclerema is one of the results of stence of the fœtal condition of the lung, not differing in its nature from œdema following pulmonary obstruction. The oc- of undoubted cases of sclerema in the adult, and the frequent f atelectasis in well-marked cases of sclerema in infants, appear, to render this view untenable.

tire venous system and the cavities of the heart are distended fluid blood; but the heart presents no constant condition to ild be attributed the production of the disease. The jaundice been mentioned as occasionally existing, is not found to be l with any abnormal condition of the liver, excepting conges- itero-colitis is a rather frequent complication of sclerema, and regarded as influencing its development; but this view has long n abandoned. Elsaesser found intestinal lesions and hyperæmia lominal viscera quite commonly; and, in eight of his cases, peri- is present.

IENT.—The preventive treatment of sclerema consists in atten- l the hygienic conditions of the young infant.

rative treatment implies the removal of all the causes, and the n of remedies calculated to restore the force of the circulation, function of the skin. *Warmth* stands foremost as a curative and recourse may be had to warm baths or hot vapor baths, and is with hot oil; hot sand or bran-bags may be applied to the nd the temperature of the room should be carefully regulated. ld should be nourished with breast-milk; and stimulants, such as y, should be freely given. Cordial and aromatic draughts are also ided, which may be formed of any of the diffusible stimulants.

e is reason to believe that some relation exists between sclerema ctasis pulmonum, we should, in addition, resort to all those pecially adapted to remove this condition, for a full account of reader may refer to the article on collapse of the lungs.

ne plan of treatment is advisable in cases in adult life.

se means we may hope to arrest, and even cure this strange when it has not involved any considerable portion of the surface.

# WORMS IN THE ALIMENTARY CANAL

## GENERAL REMARKS.

THERE are five different species of worms found in the canal. These are the Ascaris lumbricoides, or round wor vermicularis, thread-worm, seat-worm, or, as it is popularly rides; Tricocephalus dispar, or long thread-worm; Tænia mon tape-worm, or long tape-worm; and the Bothriocephalus lata, or broad tape-worm.

We shall give a short description of each of the intestinal order that they may be readily distinguished, but will treat symptoms, and treatment only of the first two, inasmuch very rarely exist during infancy or childhood, and the tric much less frequent than the round and seat-worms, and symptoms of the same kind as the former.

DESCRIPTION.—The *Ascaris lumbricoides*, or, as it is comm lumbricoides, lumbricus, or round-worm, is shaped not unlik mon earth-worm, having a cylindrical body, which is attenua either extremity, but particularly the anterior. It varies in erally between six and twelve inches, and is usually about lines in thickness. The young worm, about an inch and a hal rarely met with. The head of the animal is at the smallest and may be distinguished by a circular depression, around wh seen three tubercles. When recently voided the worms are transparent, so that the viscera may sometimes be seen throug rietes. The integument is marked by circular fibres, and by extending at equal distances from the head to the tail, the former indicate the course of the muscles, while the latter indicate vessels and nerves.

The color of the worm is whitish

netimes be seen to protrude just in front of the caudal extremity;
f the female may be distinguished by the vulva, seated at a con-
point of the body, about a third of the distance from the head to
The male is smaller and much less abundant than the female.

*Ascaris* or *Oxyuris vermicularis*, thread-worm, seat-worm, or
orm, is the smallest of the intestinal worms, and is generally dis-
hed in popular language by the title of ascarides. The sexes are
rate individuals.

male is generally about two lines in length; its body is elastic, of
ish color, very slender, and looks not unlike a piece of cotton
l, whence one of its names was derived. The female is larger than
ale, reaching a length of four or five lines. The anterior part of the
is of the same shape in both sexes. It is obtuse, and surrounded
ransparent membrane, through which may be seen a straight tube,
ng a kind of bladder, which is the œsophagus, and which terminates
lobular stomach. The head is provided with three tubercles, as in
umbricoides. The intestinal tube in the male continues the whole
h of the body, which becomes somewhat thicker towards the end,
s arranged into a spiral shape at the tail. The body of the female
aped like that of the male as far back as the stomach, and increases
e in the first third of its length, after which it diminishes, and be-
s so small at the end as to be seen with difficulty by the naked eye.

e *Tricocephalus dispar*, or long thread-worm, is generally about an
and a half or two inches long, and consists, as it were, of two por-
, of which the anterior, constituting about two-thirds of the length,
ceedingly slender, scarcely thicker than a horse-hair, while the pos-
r third swells out suddenly so as to become much thicker and larger.
sexes are in different individuals. The worm is provided with an
ntary canal, which, commencing at an orbicular mouth placed in
mall extremity, runs through the animal to the anus, placed at the
al extremity. The male is smaller than the female, and is, usually,
l convoluted. This worm is met with chiefly in the cœcum and colon,
cularly the former. It usually exists in very small numbers, and
times but a single one is found. The symptoms which it occasions
he same as those produced by the lumbricoides.

e *Tænia solium*, common or long tape-worm, as well as the Tænia
are of rare occurrence in children. Of 206 cases observed by M.
ruch, only 22 occurred in subjects under fifteen years of age, and of
the youngest was three years and a half old (*Bib. du Méd. Prat.*, t.
626). These worms have, however, been met with at an earlier age,
s they are rare, we deem it unnecessary to do more than describe their
arance, in order that the reader may be able to distinguish between
and the varieties which generally exist in children, the Ascaris
ricoides and vermicularis. For a full account of the symptoms pro-
l by the two varieties of the tænia, and their treatment, the reader
ferred to any of the standard works on the practice of medicine.

e *Tænia solium* is usually of a whitish color, flat in form, and vary-
n length from five to ten feet, its ordinary length, to sixty, or even,

part of the worm, and resemble, when separated, the
and have hence been called cucurbitani. In this worm
exist in the same individual.

The *Bothriocephalus latus*, *Tænia lata*, or *broad*
flat like the preceding variety, but it is generally thinner
measuring from four to ten lines in breadth. It sometimes
the common tape-worm, to a very great length. It is
white color, and rather less opaque than the tænia
tinguished also, says Dr. Wood, from the other tænia, by the
segments, which are broader than they are long; by the
which is small, elongated, without spines, and divided into
a longitudinal fossa on each side; and by having, instead
mouths of the tænia solium, a single minute pore in the
the fossæ, or else two pores, one at the extremity of each

The *frequency* of intestinal worms, and their *importance*
disease, have certainly been, and are still by many physicians
cially by the public, very greatly exaggerated. There can
that they do, when they exist in large quantities, and
certain countries, give rise to great disturbances of the
and even occasion death; but such instances are, it
tremely rare in this city at least. We are quite sure that
as yet met with a case, in our own experience, in which
seriously endangered by their existence.—though we have
instances in which slight disorders of the digestive
ous nervous symptoms, generally of very moderate severity,
peared after the administration of anthelmintics, sometimes
in an equal number of cases probably, not followed, by the
worms.

To show the truth of the above remarks, as to the
as a cause of disease, we make the following quotations: Dr.
*Inquiries and Observations*, vol. i, p. 205), remarks: "When

th incontestable traces of their effects, and which are of them- cessarily fatal." M. Barrier (*Mal. de l'Enf.*, t. ii, p. 100) quotes sseau as making the following remarks: "For sixteen years we met with a single child who has presented any verminous symp- ever or almost never does a child born and reared in Paris dis- worms, while just the contrary is true as to the provinces. . . . . children, to be sure, are sometimes met with in our hospitals, who ge worms, but they are those who have been born in the coun- l have lived in the capital only for a short time." Dr. Condie *Child.*, 2d ed., p. 226), remarks: "Worms are a very common nce in the intestines of children, and may unquestionably, under circumstances, become a cause of severe irritation; but much less tly than is generally supposed."

believe we may conclude, therefore, that though these parasites are common occurrence, and productive of grave disorders in some ies, they are rarely met with in quantities sufficient to do serious to the health, in other places, as for instance, Paris, and probably country, or at least in the northern parts of it.

intestinal worms do, however, not unfrequently in some countries, casionally in all, produce dangerous and even fatal disturbances health, cannot be doubted after careful perusal of the evidence t forward by different authorities. M. Guersant, amongst others, s (*loc. cit.*, p. 670): "It is nevertheless incontestable, that the pment of these animals in the gastro-intestinal and abdominal s, does sometimes give rise to very varied morbid phenomena, are in some instances grave enough to cause death." Neverthe- e are disposed to believe, as stated above, that fatal, or even dan- results from the existence of these parasites, are of rare occur- in this city, and probably throughout our Northern States. Dr. s, however, mentions several cases in which they produced alarm- mptoms, and one in particular (*Dis. of Child.*, p. 492), in which the t, a child twenty months old, was extremely emaciated, and whose en was "enormously distended, and semi-transparent," who re- d rapidly after ninety-six lumbricoides, from six to ten inches long ad been expelled under the use of pink-root in infusion.

## ARTICLE I.

### ASCARIS LUMBRICOIDES.

*description* of this worm has already been given at page 870.

SES.—Under this head we shall not pretend to consider the ques- the origin of worms, but only the causes which predispose to their tion, or favor their growth.

has no doubt a considerable influence upon the predisposition to

lumbricoides. According to M. Guersant (*loc. cit.*, p
breast under six months of age are very rarely affe
stances occasionally occur, but are altogether excep
rule. Above six months of age, they begin to be m
rarely, so that scarcely one or two will be found in
dren of a very early age; while from three to ten y
be observed in about a twentieth, or in some season
proportion. M. Valleix states that he has never m
born children. Dr. Dewees says (*loc. cit.*, p. 481), th
worms in children under ten months old; and in
that age. We do not recollect ourselves ever to ha
jects younger than eighteen months, and very rarely
or four years.

There can be little doubt that the disposition to w
some families. It is generally believed that the spe
tion is more common in *girls* than *boys:* that it is m
dren of *lymphatic* and *scrofulous* constitutions: and t
vegetable or milk *diet*, and an abuse of *fruits*, strongl
production. The *habitation* of a cold and damp,
climate, and the *seasons* of summer and autumn, are
also to favor their production and growth. It is a g
should suppose from personal experience, a well-found
and disordered state of the digestive function from
as a predisposing cause of worms, and particularly o

Seats.—The small intestine is, in a very large ma
the seat of the ascaris lumbricoides. They are me
other parts of the digestive tube, particularly the sto
testine, and more rarely in the œsophagus or pharynx.
they are found to have migrated to other organs, a
bladder, and in still rarer cases, they have passed i
cavity, bladder, larynx, trachea, bronchia, and even i
sages and frontal sinuses. They have also been met
the walls of the abdomen, forming verminous absce
have escaped on the opening of the abscess.

The *number* of ascarides is exceedingly variable:
two or three, ten or twenty, or several hundred. Wh
they are apt to be rolled or twisted into knots or ball
seen as large as the fist, so as to block up complete
intestine. In a case cited by Rilliet and Barthez, fr
duodenum was so filled with worms as to be diste
acquired a considerably larger size than natural, whil
it was hard and elastic. The jejunum, ileum, and cæ
that it seemed as though the worms must have been
They were found also, but in smaller quantity, in the
(*loc. cit.*, p. 230) states that he has known one hundre
bricoides to be voided in a single day, by a child five y
however, to be remarked, that the instances in which s
are met with are altogether exceptional, especially in ou

er ourselves known more than six, eight, or ten to be ex- a few days' time, and very generally there have not been ee, four, or five.

L Lesions.—When the number of lumbricoides is small, the brane has been found in a state of perfect health, while, on when they are numerous, and especially when collected to- nots, the membrane has presented a fine injection like that in erythematous enteritis; in some very rare instances on ich the quantity of worms has been very great, the mucous s been found deeply injected, thickened, granulated, and, in portion of cases, softened, and even eroded. Not unfre- testine presents all the characters of well-marked enteritis, itis, though the number of worms may be very small. In is reasonable to suppose that the inflammatory affection has ental complication of the verminous disorder.

ssion has arisen in regard to the manner in which *perfora-* testine, as an accompaniment of worms, takes place. It is suppose, in subjects in whom worms are found in the peri- or in abscesses formed in the abdominal parietes, that per- e bowel has taken place, and yet in some instances no trace g is left, no inflammation of the serous membrane is met there been any escape of the contents of the digestive canal ominal cavity. In others, however, and much the most es, it is evident from the anatomical appearances, that the s taken place in consequence of previous ulceration of the owel, and that the worms have escaped with the other con- ntestine. It is in regard to the former class, therefore, that s principally taken place; some asserting that the parasite the opening, by an active process, while others deny the this occurrence, and maintain a previous ulceration or soft- ases. Amongst those who advocate the possibility of per- endent of previous change in the intestinal coats by disease, dière and Charcelay, the former of whom has examined the a great deal of care, quoted by Rilliet and Barthez; Rilliet themselves; the authors of the *Biblioth. du Méd. Prat.*, and ; while amongst those opposed to this opinion may be cited, ier, Barrier, Dr. Arthur Farre, who greatly doubts the pos- accident, and Dr. Condie. We confess ourselves inclined m facts stated by different authors, and from the history of ich occurred to M. Guersant in 1841, at the Children's Hos- (*loc. cit.*, p. 680), that worms may in some instances cause independently of previous disease of the coats of the intes- of these, two lumbrici were found engaged in an opening lix vermiformis, half the bodies of the animals being in the l half in the peritoneal sac; while in the other, an opening ind as in the previous case was found in the appendix, and ree worms which were found lying in the abdominal cavity, scaped through an ulcerated perforation of the colon, it is information. These abscesses have been, in very rare inst in the pharynx and nasal passages, but much more frequen in the abdomen. The latter may be of two kinds, sterc *stercoraceous*. In the former, the abscess, which forms tion of the walls of the abdomen, gives issue not only to worms, and pus, but also to fecal and even alimentary leaves behind a fistula connecting with the cavity of the may cicatrize after a short time, or remain open during life. form of abscess, the opening through the coats of the intes closed immediately after the passage of the worm, so th gives issue only to the animal and pus, after which it heals giving rise to a fistula.

The verminous abscesses are said to be found generally guinal and umbilical regions; to occur most frequently betwe of seven and fourteen years, and not to be, as a general ru gerous to life.

SYMPTOMS INDICATIVE OF THE PRESENCE OF WORMS.—W is almost universally acknowledged by later writers, that the gle symptom, nor group of symptoms, other than the exp worms, and their detection, which indicate with certainty the in the digestive tube. This is the expressed opinion, am of MM. Guersant, Rilliet and Barthez, Barrier, Valleix, and and Condie, and it is also the opinion which we have ourselve to form from our experience amongst children.

Another point worthy of remark is, that even though worms may have been expelled, it is not always fair to conclud symptoms under which the child labors, are the result of the others of these animals, as there may be no more in the bowels may be so few in number as not to produce injurious effects.

ìnd painful to the touch; the condition of the bowels varies in ·ases, as they are sometimes costive, and sometimes affected with According to M. Guersant, the stools often contain glairy sub- .nd are sometimes streaked with blood and of a yellowish-green e patient often suffers from colics, which may be either dull or ›ugh more generally the latter, and which are generally felt at lical region. Children affected with lumbricoides are said to peculiar physiognomy; the face is usually paler than natural, times has a leaden tint; the eyes are surrounded by bluish rings, at the same time a dull and languid expression; the inferior ·e often swelled and puffy; the sclerotic coat of the eye assumes tint; the nostrils are said to be sometimes swelled, and the child s much of irritation and itching of those parts, and is constantly t them with the fingers. In some instances epistaxis takes place. l is generally pale and thin, indolent and languid, or irritable ıppy. The sleep is almost always disturbed. This indeed is, to us, one of the most important signs both of worms and of ınctional disorders of the stomach and bowels. The nights are ways restless, the patient either waking often to drink, or waking and alarm from dreams, or else constantly tossing and turning moaning, or grinding the teeth.

ɪymptoms mentioned by different observers, and by some very ›ended upon, are acceleration with irregularity of the pulse, and especially unequal dilation, of the pupils. We might cite also ıs, and occasionally cough.

:lren in whom the number of lumbricoides is very large, the con- suffers to a dangerous degree. The symptoms above enumerated marked, and at the same time the child is very pale or sallow, l, weak, and without appetite; the abdomen is hard and tumid; ·us symptoms are severe, and some of the symptoms which we cribe presently, under the head of disorders occasioned by re also observed.

ld be remarked, however, again, that all or any of the symptoms ·ibed may exist independently of the presence of worms, the only gn of which is their expulsion from the patient.

ɔ Effects Occasioned by Worms.—MM. Rilliet and Barthez e accidents or effects produced by the existence of lumbricoides groups: those which result from the mechanical influence of the as their accumulation or displacement; and those which appear consequences of a purely sympathetic action on the different ›f the body, and particularly the nervous system.

.nical Effects.—Under this head are included perforation and ge of the intestine, enteritis, abscesses, and the symptoms deter- the displacement or migration of the worms into the ductus s choledochus, liver, or air-passages.

oration and abscesses we have already treated under the head ical lesions. Hemorrhage is a very rare event, but it occurred stance cited by MM. Rilliet and Barthez, and Guersant, from

M. Charcelay, in consequence of the rupture of an
rounded ulceration in the duodenum, apparently oc
ence of a large number of lumbrici. Enteritis, as an
of worms, has also been referred to under the head
sions. In many instances it is, no doubt, a mere acc
in no way connected with the presence of entozoa: p
a large majority of the cases. When, however, the
sites is very great, and particularly when they are c
firm knots and bundles, they may, no doubt, occasio
irritation, inflammation, thickening, softening, and
the mucous tissue, as in cases cited by M. Guersa
neau and Charcelay, and in one which occurred to l
remarked, however, that the cases on record in w
dently depended upon the presence of worms, are.
few in comparison with those in which no such al
which it was evidently independent of any influence

EFFECTS CAUSED BY THE DISPLACEMENT OR MI
Lumbricoides have been found, as we have already
the abdomen, giving rise to abscesses. They have
in the ductus communis choledochus, in the gall-bl
in the substance of the liver, forming abscesses, a
canal. The symptoms occasioned by the latter cl
obscure. In one instance, M. Guersant supposed tl
vulsions depended upon the presence of worms in tl

More numerous examples are on record, in which
cough, and fatal asphyxia, have occurred in consequ
of lumbricoides which had passed into the œsophag
troduction into the larynx, trachea, or bronchia.
sioned by these accidents are a sudden attack of dy
tation, threatened suffocation, dry, spasmodic cough
pain in the larynx or trachea, and, unless relief be obt
death. This kind of attack may depend on the rising
of worms into the œsophagus, causing pressure on the
as in the case reported by M. Tonnellé, in which tl
peared after the expulsion of a large number of wor
met with an instance of this kind. It occurred in a
presenting every mark of strong and vigorous health
or four weeks before we were consulted in regard to
ject to sudden and apparently causeless attacks c
seized him without the least warning. When the
would for some instants cease to breathe, or breathe
He always seemed to suffer from the greatest anxie
became altered and distressed; he was unable to sp
for water, and when able to swallow a mouthful, w
ceedingly difficult, was at once relieved. His mot
always appeared to be in the greatest distress, so tl
sions, she feared for his life. Striking him violently
she, when present, always did, sometimes relieved hi

continued until he could swallow a little fluid of some kind.
tacks were unattended at the time by cough, nor was there the
n of disorder of the respiratory system in the intervals between
uspecting that the difficulty must depend on the rising of a
worms into the œsophagus, or upon sympathetic irritation from
ence of these parasites in the stomach, and learning that he had
ubled with worms some years previously, we gave him wormseed
h caused the expulsion of a few large lumbricoides, after which
no return of the symptoms.

attacks of dyspnœa may depend also, as already stated, on the
ction of worms into the air-passages. Under these circumstances
s very apt to be the result. In one instance, however, reported
Arronsshon, after the difficulty had lasted two hours, the patient,
girl eight years old, after violent efforts at coughing, threw up a
umbricus.

have next to consider the *sympathetic effects*, and particularly the
*s symptoms*, occasioned by worms. We may include amongst the
s symptoms produced by worms the headache, languor, irritability,
s and disturbed sleep, and grinding of the teeth, so frequently ob-
. These, however, are of but slight importance in comparison with
other disorders of the nervous system, which do undoubtedly
sometimes, though we should suppose *very rarely*, in proportion
whole number of subjects affected with the parasites. The disor-
which we allude are partial or general convulsions, chorea, hyste-
talepsy, and epilepsy, which are the most frequent, though, as so
stated already, extremely rare in comparison with the number of
in which the presence of the worms produces no such effects.
disorders cited by the authors of the *Bib. du Méd. Prat.*, with cases
ve their reality, are insanity, paralysis, coma, palpitations, strabis-
ough, hyperæsthesia of the skin, amaurosis, and aphonia.

NOSIS.—It has already been stated that there are no certain signs
presence of worms in an individual except their expulsion. The
oms which have seemed to us most strongly to indicate their
ce are, a chronic disordered state of the digestive apparatus, pro-
irregular appetite, which is sometimes good and at others bad;
emaciation; paleness or unhealthy tint of the complexion; languid
ssion of the face; some irritability of the temper, or a want of the
and activity of disposition natural to childhood; picking at the
often some tumidity of the abdomen, which may be at the same
ither hard or merely tympanitic; and, what seems to us more im-
nt than any that we have named, very restless and broken sleep at
, with frequent grinding of the teeth.

Valleix remarks that, in a case presenting nervous symptoms simu-
disease of the brain, we may suspect the existence of worms, if we
upon inquiry that symptoms of marked intestinal disorder, the
s signs cited above as indicative of the presence of worms, and
ent derangements of digestion, had preceded for some time the

portions of imperfectly digested aliment, or foreign which most resemble lumbricoides, are the remains of vessels, fibres of plants, &c. To make the distinction the doubtful substance ought to be placed in water, so thoroughly cleansed, after which it must be carefully structure, arrangement, consistence, &c., with the eye, microscope, if necessary. M. Guersant has suggested a very of ascertaining whether the substance be animal or to subject it to heat, after it has been carefully washed, will at once inform us of its real nature.

Prognosis.—It is no doubt a very rare event, at least in parts of our country, for life to be endangered by the We have never, ourselves, met with an instance in which health was more than moderately disturbed by this cause. ous affections are sometimes, however, dangerous to life in shown by three cases related by Dr. Dewees, in which threatening symptoms were instantly relieved upon the brici after the exhibition of vermifuges.

Worms become dangerous to life when they migrate from seat to neighboring and important organs, particularly the and liver. The prognosis is unfavorable also when they very large numbers, and give rise to the different nervous above described.

Treatment.—Before commencing our remarks upon the edies employed for the destruction and expulsion of worms mentary canal, we would call the attention of the reader to most of the recognized anthelmintics are more or less gastro-intestinal mucous membrane, and some of them to system also, producing, in overdoses, severe and even symptoms. It is evident, therefore, that remedies of this arious quack nostrums, which are sold to an amazing extent in , and all over the country.

e diagnosis of worms is always doubtful, it is best never to risk inistration of any of the irritating vermifuges, unless convinced, revious expulsion of worms, that they are almost certainly pres- d, indeed, we ourselves rarely give any other remedy than small es of the *wormseed oil* in slight, and especially in doubtful cases, his has already been tried and failed. From our own experience, eve that this remedy is all-sufficient in a large majority of the at occur in this city, as these are almost always of a mild char- nd as it not only produces the expulsion of the parasites when ist, but also acts beneficially upon the forms of digestive irritation simulate so closely the symptoms produced by worms. We are ded, indeed, that of all the cases that have come under our notice, h it seemed probable that worms might be present, none were d in nearly half, and yet the signs of disturbed health have passed nder the use of the remedy. The oil of wormseed may be given s of four drops to children of two years of age, and of six or ten e above that age, three times a day for three days, to be followed morning of the fourth day by a moderately active, but not irritat- thartic dose, the best of which is castor-oil or syrup of rhubarb. jection to the remedy is its nauseous taste and smell; these, how- ay be partially disguised by making it into a mixture with yolk , powdered gum, and syrup of ginger. Some children take it very opped upon a lump of white sugar, while others take it best mixed ommon brown sugar. If one course of the oil, as it is called, fail ve the symptoms, another should be administered. It ought to llected that, when given in large doses, the wormseed oil is irritat- the digestive mucous membrane, and produces dangerous nervous oms. We know of one case, in which a girl six or seven years of s made exceedingly ill, and suffered for years afterwards, from the of a teaspoonful of the oil given by mistake. The following is a ood formula for the administration of this remedy:

℞.—Ol. Chenopodii, . . . . . gtt. lx vel f℥j.
P. G. Acaciæ, . . . . . ʒij.
Syrup. Simp., . . . . . f℥j.
Aq. Cinnamom., . . . . . f℥ij.—M.

a dessert-spoonful three times a day, for three days, and repeat after several

wormseed may be given also in powder, in the dose of from twenty y grains.

remedies most frequently employed in this country besides the eed, are pink-root or spigelia, oil of turpentine, calomel, and the s of cowhage.

believe that the *pink-root* is more depended upon amongst us than her single remedy. It is given either in substance or infusion. se of the powder is from ten to twenty grains for a child three or

three, four, or five days, when it
resumed, if necessary. A prepara
title of worm-tea, and which we ha
cess, consists of the spigelia mix
different proportions, made into
sugar. Dr. G. B. Wood (*Pract. o*
following formula:

℞.—Sennæ, Spigeliæ, .
Magnesiæ Sulphat.,
Mannæ, . . .
Fœniculi, . .
Aquæ Fervent., .

These are to be macerated for
tablespoonful given to a child two
other day, so as to procure two or
hours. The remedy is continued f
if necessary, and if it do not debil

The *spirit of turpentine* is highl
for worms by several authorities,
and Dr. Condie, of this city. Dr. C
which he has derived the most dec
that it may be given when there ex
mentary canal, or even subacute i
increasing either. He gives the r
molasses, or in the following mixtu

℞.—Mucil. G. Acaciæ,
Sacch. Alb., .
Spir. Æther. Nitr.,

have already said on several occasions, that it is a remedy which, powerful influence it exerts upon the constitution, ought not to except when really called for; and, as we can almost always suc- uring verminous affections by milder drugs, we see no occasion rting to this, except in rare cases. When used it is given alone derable doses, and followed by some cathartic, or in combination barb and jalap, or jalap, or scammony.

ristles or down of *cowhage* are also used by some practitioners, t sometimes with success. We have never used them, and can opinion, therefore, from personal experience, as to their efficacy. e administered by making them into an electuary with honey, r molasses, a teaspoonful of which is given every morning for ays, and then followed by an active cathartic.

following *electuary*, recommended by Bremser, is very much em- in Europe, and is highly spoken of by Dr. Eberle:

℞.—Semin Santonicæ (semen-contra of the French writers),
Semin. Tanaceti rude contus., . . . . . āā ℥ss.
Valerian. pulv., . . . . . . . . . ʒij.
Jalapæ pulv., . . . . . . . . . . ʒjss–ij.
Potass. Sulphat., . . . . . . . . . ʒjss–ij.
Oxymel. Scillæ, . . . . . . . . . q. s.—ut ft.
Electuarium.

poonful of this is given morning and evening for three or four days, the dejections generally become more copious and liquid. If it do oduce this effect, Bremser advises that the dose be increased. Dr. e gave it for six or seven days, and says it does far less good when duces frequent and watery evacuations, than when it causes only or four consistent stools a day. This preparation has a very disa- ble taste, and children sometimes refuse to take it on that account. this is the case it may be made into pills.

I. Rilliet and Barthez recommend the following *syrup*, which was sed and highly thought of by M. Cruveilhier:

-Follicul. Sennæ, Rhei, Semin. Santonic., Artem. Abrotan.,
Helminthocort., Tanaceti, Artemis. Pontic., . . . āā ʒj.
nfused in half a pint of cold water, strained, and made into a syrup with sugar, of which a tablespoonful is to be given every morning for three days.

uveilhier states that this syrup has been very successful in his hands. te years, santonine, the active principle derived from the European seed, has been much employed and with very good success. The ly may be given in doses of from gr. ij to gr. v, combined or fol- by a dose of castor-oil or senna. The *empyreumatic oil* of Chabert highly spoken of by some European authorities. It is made by g one part of the empyreumatic oil or fetid spirit of hartshorn, with parts of spirit of turpentine, and allowing them to digest for four The mixture is then put into a glass retort, and distilled in a sand- until three-fourths of the whole have passed over into the receiver.

of valerian, are to be boiled in a pint of water down to a
spoonful of the decoction given morning, noon, and even
ticularly beneficial in cases attended with the usual symp
connected with want of appetite and mucous diarrhœa
debility of the digestive organs, and a vitiated condition
secretions.

Kameela, the reddish-brown powder which clothes the
rottlera tinctoria, has been of late highly recommended
of tænia, but of ascaris lumbricoides.

The dose for children is about gr. v, repeated till it
bowels.

In all cases of deranged health supposed, either from
symptoms, or proved by the previous expulsion of worms
the presence of these animals in the alimentary canal, it
important to attend to the *hygienic treatment* of the
instances to administer *tonics* and *stimulants*. In not
have come under our own notice, in which many of the
posed to indicate the presence of worms have been extreme
we have succeeded in removing them all without a resort to
by the treatment proper for the chronic indigestion or
dren. The method of treatment to be employed in such cases
been laid down in the article on indigestion, to which
ferred for full information. It should consist chiefly in
to exercise and diet, and in the use of tonics, as quinia
small quantities of fine port wine.

Whenever any complication exists in connection with worms
ment must be modified according to its nature. If it consist
mation of any part of the digestive tube, the inflammation
attended to first, and the verminous disorder for the time
If the inflammation be very slight, or if the

s, or upon a simple dyspeptic condition of the digestive organs,
t prudent to give only the simplest and least irritating vermi-
regulate the hygienic conditions of the patient, and afterwards
to tonics, if necessary.

us writers, and particularly M. Guersant, advise that we should
n verminous cases, the use of relaxing food, especially of milk
tions, fruits, and of fatty and farinaceous substances; and that,
e expulsion of the worms, we should direct a tonic and strength-
egimen. The diet should consist of boiled and roasted meats, of
nd of bitters. The author just quoted, states that a change of
ne will often suffice to procure the expulsion of worms. He says
*le Méd.*, t. xxx, p. 689), "I have met with children who had been
ted with ascarides lumbricoides while residing in the country and
ipon milk and fruits, and who, upon being brought to the city,
t upon the use of broths and soups, passed considerable quantities
ns, and after that got entirely rid of them."

## ARTICLE II.

### ASCARIS VERMICULARIS.

*description* of this worm has already been given at page 871.

T.—The ascaris vermicularis is found almost exclusively in the
intestine, and in a large majority of the cases is confined to the
n. It is said to have been found in the vagina in the female, having
ubt passed from the rectum into that canal.

*causes* which determine the presence of this worm are not at all
stood.

PTOMS.—The characteristic, and often the only symptom indicative
ir presence, is violent itching about the anus, which is sometimes
t insupportable, and which is generally most troublesome and most
occur at night when the child is in bed. In some instances they
ise to acute and violent pain in the region of the anus, and some-
to tenesmus and mucous or bloody stools. When the last-named
symptoms exist, the worms may occasion dangerous nervous dis-
, and even give rise to general convulsions. The worms not unfre-
ly escape from the rectum and are found upon the bedclothes, or
the clothes which the child has worn through the day. Sometimes
re discharged in considerable numbers, and are found in that case,
mixed with the fæces, or with mucus, or collected into balls or

*diagnosis* of the seat-worm, like that of the lumbricoides, cannot
arded as positive, unless some have been expelled, or unless they
seen by examination of the rectum. This can generally be done
hey are present in any number, by pressing the nates apart so as

They are, however, exceedingly troublesome, because of
of removing them entirely by any treatment. No matter
discharged, some almost always remain concealed in the
mucous membrane, and, as they are propagated with great
same train of symptoms is very apt to return soon after
been seemingly dislodged.

**TREATMENT.**—It has been found by long experience that
vermifuges given by the mouth, exert much less influence
expulsion of these worms than of the lumbricoides. For this
mata are generally resorted to in the treatment, instead of
by the mouth. Dr. Dewees, however, recommends the elixir
(tinct. aloes et myrrhæ), in small and often-repeated doses
some time, and followed by enemata of lime-water.
He gave twenty drops of the elixir three times a day, in a
milk, to children from two to four years old, and thirty
between five and seven years.

The plan we have generally resorted to has been to give
the wormseed oil, as directed in the article on lumbricoides,
an injection of from four to six grains of powdered aloes,
gill of warm milk, for children four years old, to be repeated
four, or five days, according to the necessity of the case.

Lime-water by injection is recommended by several
ties. It may be given of its ordinary strength, or mixed
quantity of warm milk, or flaxseed mucilage. Other
mended are spirit of turpentine in milk, a teaspoonful of the
gill of the latter; decoction of helminthocorton; an injection
fusing two drachms of fresh garlic-cloves in three ounces
boiling water, and adding to the infusion, after it has been
scruple of assafœtida rubbed up with the yolk of an egg;
from six to twelve grains of sulphuret of potassium in half a
injections of sweet oil, or of lard beaten up with water until

his was to place a little of the ointment on the anus, by which
he patient was entirely relieved after a few days. M. Valleix
at he has obtained the same results by causing the anus to be
with the following preparation, a small quantity of which was
ed at the same time into the inferior extremity of the intestine:

℞.—Hydrarg. Chlor. Mitis, . . . . . ℈iv.
Axung., . . . . . . . . . ʒvi.—M.

ood states that a dose of sulphur taken every morning before
t has been found very useful.

et and *general health* ought always to be strictly inquired after,
nded to by the physician. For information upon these points
er is referred to the remarks upon hygienic treatment in the last

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